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Making Steam Turbine Diaphragm Blades

Novel Planer Fixture Permits Planing at Several Angles
with One Clamping—Centrifugal Babbitting of
Large Bearings—Unusual Radius Tool

REFERENCE was made in a previous article covering steel foundry practice at Schenectady works of the General Electric Co., [THE IRON AGE, Oct. 2, page 815] to the blades which are set in place in the core box, before cores are rammed for turbine diaphragms. There are some interesting operations on these blades before they are sent to the foundry. Certain blade dimensions must be rigidly maintained in the assembled turbine, regardless of the fact

sheets which have been run through straightening rolls. Quarter-inch and over thicknesses are annealed in sand. They then are ground to thickness in a vertical spindle surface grinder, 0.010 in. per side being the average amount removed. The next step is cutting to exact form. This is done in a planer for the smaller blades and in a slotter for the larger sizes. The illustration shows a set-up of small blades in the planer, being held by two long bolts between clamp bars, one at each end



(Right) Exhaust Edge of Blades Is Milled to Form and to Gaged Thickness. The roller below the milling cutter follows the templet



Small Blades Are Clamped in a Fixture Which Permits All Sides to Be Planed in One Set-Up. Large blades are slotted in a similar fixture instead of planed (left)

that they are subjected, after machining, to the intense heat of being cast into place in the diaphragm.

The form must be held closely, as the space between the back of one blade and one edge of the next is the governing factor in admission of steam uniformly from a higher pressure wheel bucket to the bucket of the next lower pressure wheel. Maintenance of this uniformity in producing the blades is not only important but tedious. Consideration must be given also to anchorage in the cast diaphragm, that there may be no burning off of edges, warping nor loosening. Success of present practice is due partly to changes in machining methods and partly to changes in foundry practice.

The blades first are cut to template form from

of the group. At one end is a steel block which serves to set the tool exactly to position and gives the shape to which the blades are to conform. Provision is made for swinging the clamped blades as a unit, on centers, so that the four sides may be planed. The jig follows the job through the machining operations.

To provide fixed area for steam admission to bucket, the nozzle or exhaust edge must be accurate to length. This edge must also be beveled and held to close limits. It was formerly the practice to leave this edge thick and then bevel it to gage when the diaphragm was returned from the foundry. This practice was necessary, as considerable extra stock was cast in the diaphragm nozzles which would burn the thin edge of the blades,

if they were beveled before going to the foundry. A change in foundry practice now leaves little surplus stock in the nozzles, so that with the edge of the blade beveled, a negligible amount of chipping in the casting produces a nozzle within 2 or 3 per cent of drawing area. This change saves considerable machining, the rough beveling of the blades having been done formerly with the diaphragm mounted on a circular table before a shaper, in the ram of which was an electric drill with an end-milling cutter. Finish beveling was done by hand.

Next comes the drilling of anchor holes in a multiple spindle drill press, followed by the bending operation. The bend is compound, as it serves to reverse the direction of travel of the steam. Small blades are bent under a punch press, larger ones in hydraulic presses. The bending is done hot, after which comes the inspecting of the bend. As the shoulder of the bend of one blade must be sufficiently accurate to form a nozzle when in conjunction with the edge of the next blade, this inspection is most important. The illustration showing the hydraulic bending presses shows also at



Large Blades Are Formed Under Hydraulic Presses. Each blade must lie in the proper inspection form without shake



Turbine Diaphragm Joints Having Different Angles at Center and Rim Are Planed in One Fixture in One Set-up

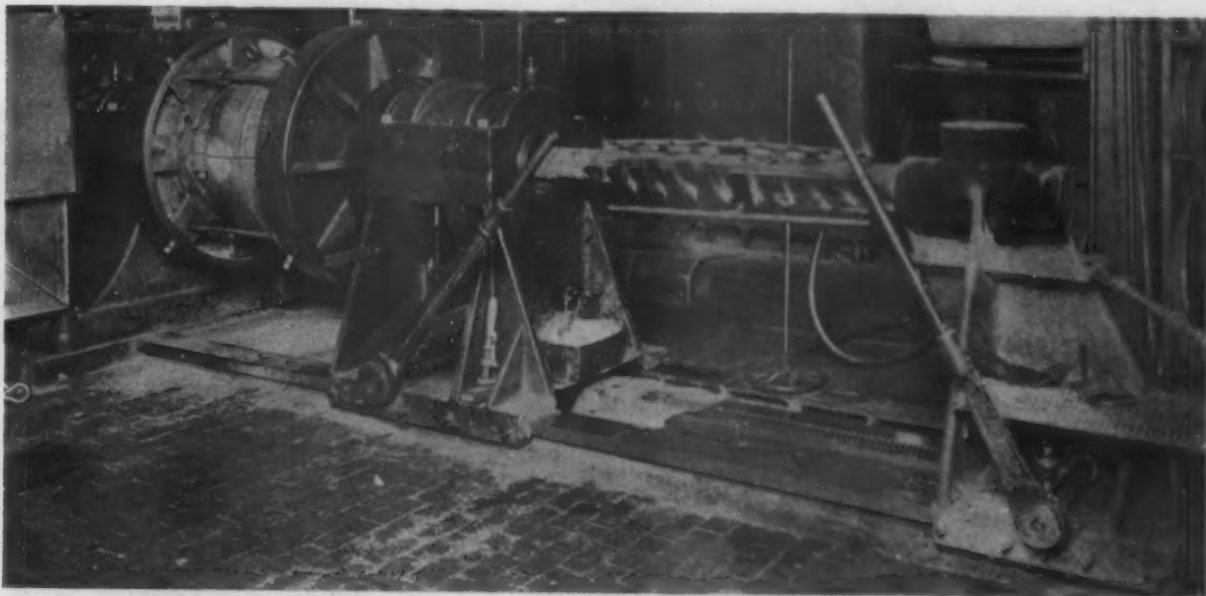
This work now is done while the blade is still flat in a vertical milling machine. The blade is mounted on the template or jig and a bevel cutter of proper angle removes stock on the edge to the desired amount. A roller on the end of the milling machine arbor, below the cutter, rides along the edge of the template to follow the contour desired. The saddle nut on the milling machine is disconnected, and a weight holds the saddle back so that the template is held against the roller, but left free to slide as actuated by the form of the template. A fixed key in the jig avoids the necessity for measuring.

left the inspection table and largest and smallest inspection forms. The form has two pins against which the notches at each end of the exhaust edge fit. When resting against these pins, the blade must lie in the form without shake. This requires that the shoulder bend and edge be absolutely to drawing, which allows a tolerance of plus 0.000 in. minus 0.005 in., as these two with the adjacent blades form steam throats. Faults are corrected by peening until correct form is secured.

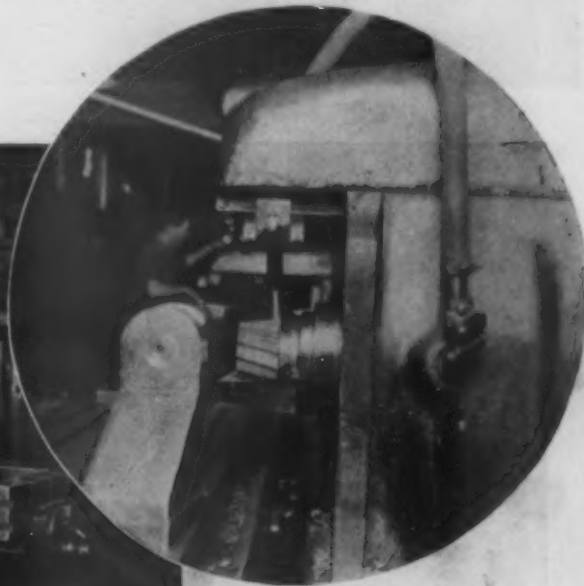
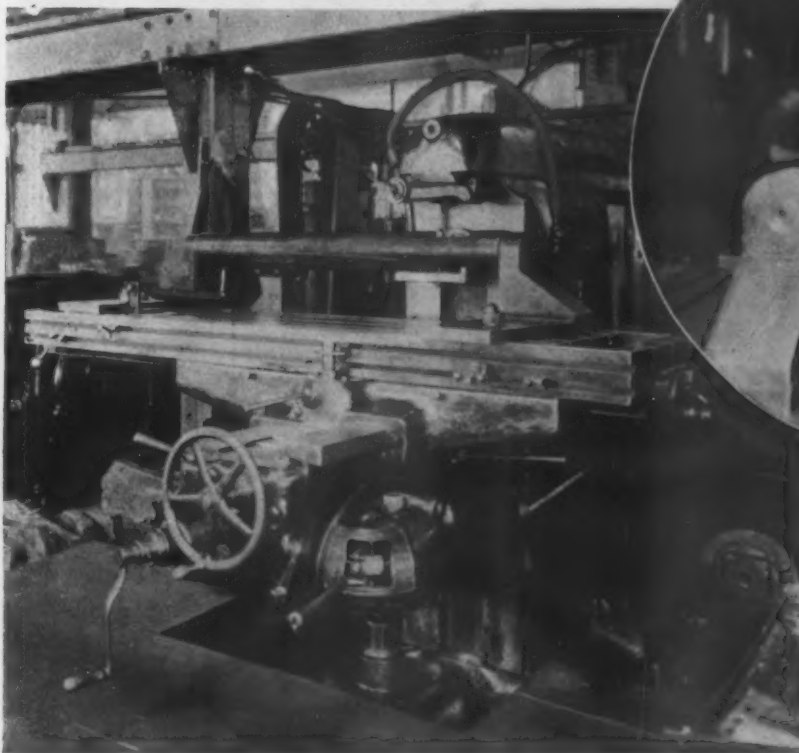
Milling of the intake edge of the blade is the operation next succeeding. This work is done in a large hori-

zontal milling machine, on the table of which is mounted a long three-quarter round drum type fixture which has clamps adjustable for different lengths of blade. The blade is clamped lengthwise of the drum, using the valley of the bend as a bearing against the fixture. The

of the turbine casing. The joint between the two halves must be absolutely tight and the pitch line of the blades must be centered. To make the job more difficult, different angles are encountered in the joint in the diaphragm center and rim.



Babbitt Is Forced Centrifugally into Anchorage Grooves in Turbine Shaft Boxes. Boxes are preheated and the babbitt flow pipe has heat applied until inserted in pouring position



Intake Edge of Blades Is Milled in a Special Fixture Adjustable for Blades of Different Lengths. Measuring on part of operator is unnecessary. Inset shows cutter position

drum is provided with trunnions and is held against a form by spring tension. The milling cutter is of angular type.

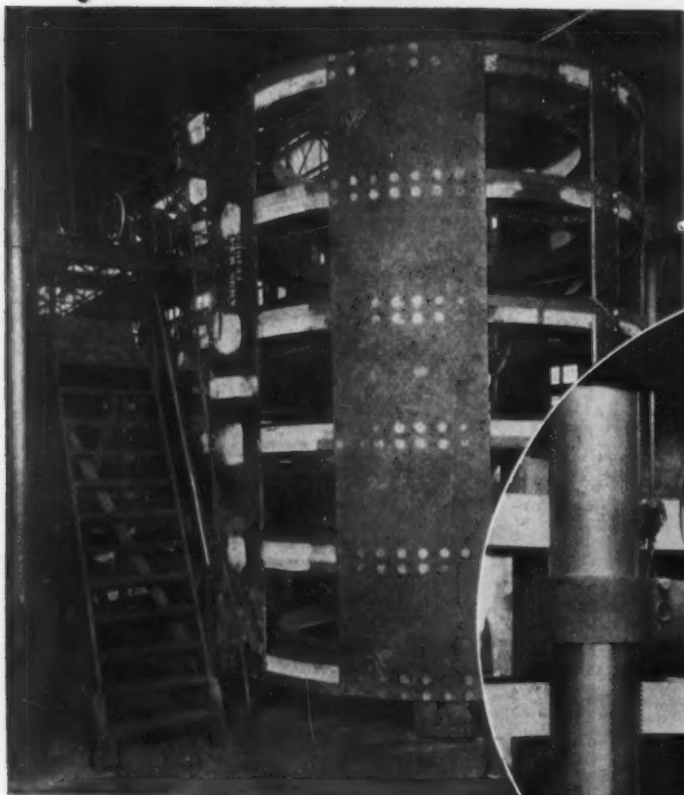
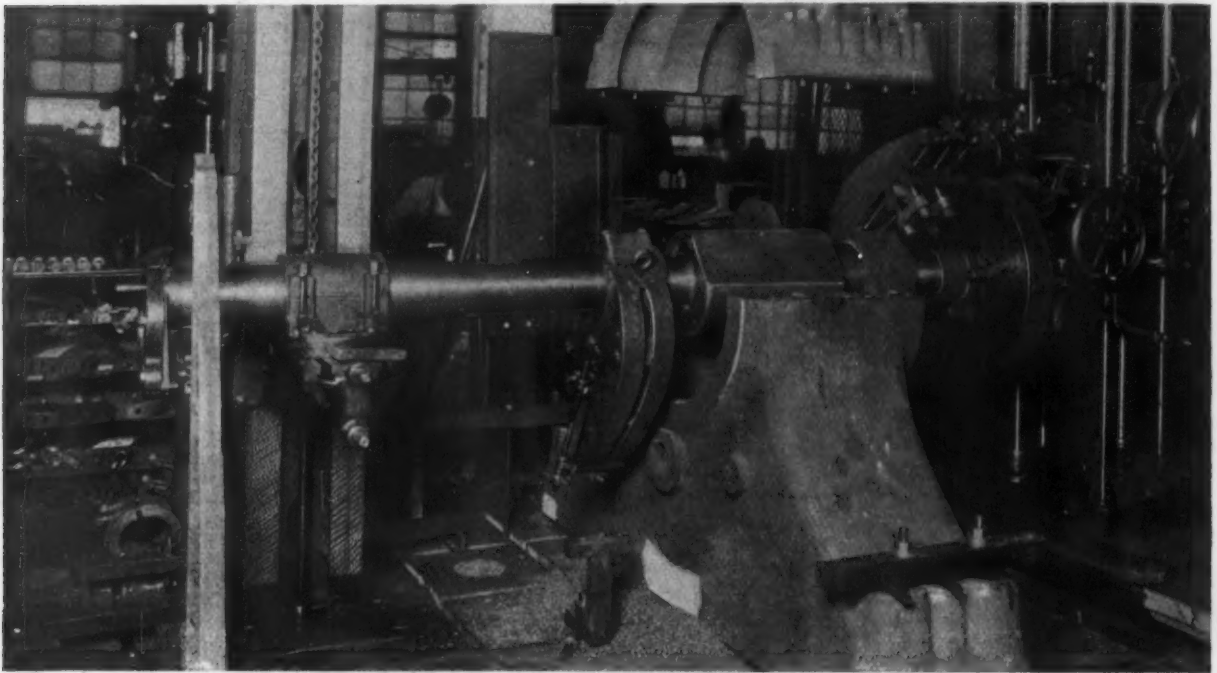
Machining the diaphragms, when sent from the foundry to the machine shop with blades in place, presents an interesting operation. These diaphragms are made in halves, as stated, to accommodate the halves

The first operation is the rough facing in a boring mill of one side of the diaphragm, to give a surface truer than the rough casting. For this set-up the casting is registered from the height of blades. The pitch diameter of the blades is used to govern subsequent set-ups, which avoids the necessity for laying out the casting. The diaphragm half is then transferred to

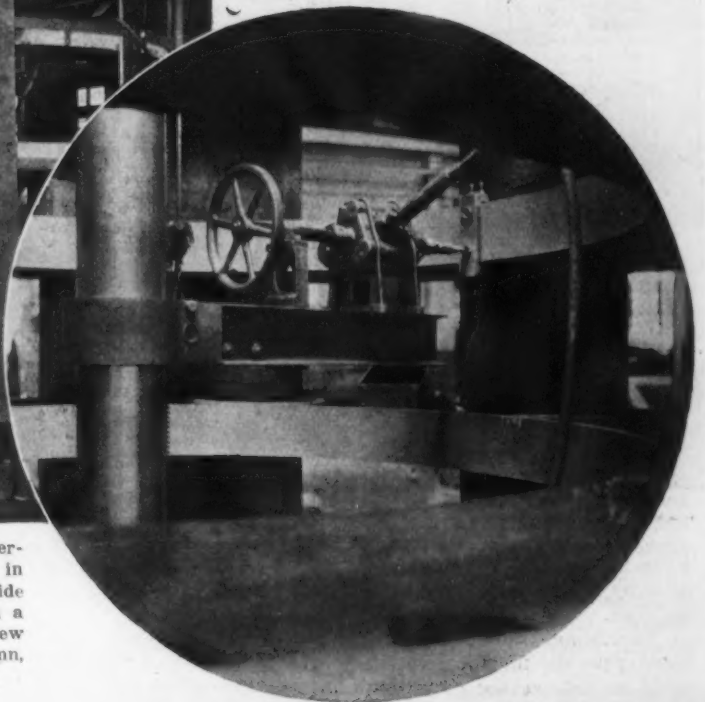
the planer, where the joints are planed. This is done in a special indexing fixture consisting of two plates, one superimposed. The lower plate is a little more than a half circle, placed with its straight edge along the planer table edge. The other plate is less than a half circle and swivels on the lower plate at the center. It is graduated on a part of its periphery. A link and screw with nut clamped in fixed position on the planer

table serve to swivel the upper table, on which the casting is mounted.

A ground pin set at the center is employed to register the casting, measuring from this pin to the pitch diameter of the blades. Two removable standards are placed in a tee-slot in the edge of the lower plate, from which the rim ends must be equidistant when setting up. These standards are removed when the work is



A Special Radius Tool Is Employed in a Standard Floor Borer to Bore the Seats in Pillow Blocks for Self-Alining Bearings. Two facing heads, one on each side, operate at the same time



Pneumatic Drills Mounted and Adjustable Vertically on Columns Are Used to Drill Holes in Generator Shell Frames and Ribs. For outside holes (view above) the shell is mounted on a turntable and revolves; for inside holes (view in circle) the shell surrounds the drill column, which revolves

placed and clamped down. The fixture is swiveled to proper graduations, according to drawing, by the screw and link referred to, for the different angles called for in the various parts of the joint. Naturally, the joint cuts through some of the blades. These partings are smoothed and slightly rounded, to avoid any obstruction to passage of steam. Subsequent operations are planing keyways in joint, drilling, finish turning and turning the packing ring groove.

Turbine shafts run in babbitted boxes. After being machined, and having babbit anchorage grooves cut in them, these are preheated before being placed in the babbitting machine, which casts the babbit centrifugally. A fixture is clamped around the box and is then placed in the machine, which has two faceplates with journals cast integral. The bearing in which one faceplate revolves is fixed in position, the other is adjustable longitudinally to allow space for setting the fixture between the plates and also to accommodate different lengths of bearing boxes. This adjustment is effected by rack and pinion, with a ratchet on the pinion shaft. During the babbitting operation this entire work-carrying portion of the machine is revolved at 500 r.p.m. by an electric motor.

Babbitt is introduced through a heated pipe by gravity. This pipe is carried on a column adjustable along an extension of the same rack which moves the work-supporting head. The feed pipe is heated by a movable gas torch with 18 flame outlets. When ready to pour, the torch is removed. The feed pipe enters through a hole in the near journal of the revolving mechanism and the babbit is poured at the far end of the pipe, through a funnel-like opening in its support.

One of the machining operations on these turbine

shaft boxes is the turning of a radial portion at the center. This finds a seat in a corresponding radial portion bored in the pillow block, making the bearing self aligning. That portion of the box is turned with a ball-turning rest. A special radius boring tool, developed by the General Electric Co., is used to bore the seat in the pillow block. The bar on which this tool is used carries also two facing heads in the horizontal boring mill. The tool consists of an enlarged portion of the bar, in which is cut a slot. In this slot is a block carrying the tool bit. The block is pivoted and its swing through an arc is controlled by a screw carried through the bar and controlled from the far end by hand wheel and gearing. The sweep of the tool produces a true radius, when set in central position in the block.

The department devoted to turbine building manufactures also the generators which accompany the turbines. A drilling job on these generator shells has called forth a special arrangement for using pneumatic drills. The shells are built up of ribs and frames, requiring some bolt and rivet holes to be drilled after the shell is partly assembled. To drill and countersink those holes on the outside of the shell, a pneumatic drill has been mounted on a structural bracket which may be elevated or lowered on a column. Before the column is a turntable on which the shell is mounted, so that any part of it may be readily presented to the drill. Frame holes drilled from the inside of the shell are for attaching pole parts. These are drilled in a similar manner, except that a jig is used and the post or column on which the drill is mounted revolves, instead of the work. The shell is lowered over the post, entirely surrounding it.

NEW INDIAN TARIFF

Legislation Protects Industry—Exports Larger— Freight Rates and Labor to Determine Future Market

WASHINGTON, Oct. 20.—The recent enactment of a protective British Indian tariff to provide for the fostering and development of the steel industry in India has directed the attention of iron and steel producers to that country, according to G. E. Phoebus, Iron and Steel Division of the Department of Commerce. Whether the new tariff will have the effect of shutting out to a large extent the British and Continental manufacturers who were so strongly entrenched in this market is a subject that is being given much consideration. The United Kingdom and Belgium have succeeded in gaining most of the Indian steel trade in recent months, with Germany taking an important share. Due partly to a lack of sufficient representation, American iron and steel have not been sold in great quantities in India recently, with the notable exception of tin plate.

Another item that merits special consideration is rails and rail accessories, for which the Indian Government has provided the additional assistance of a bounty to be operative on rails and suitable fishplates manufactured in British India from material wholly or mainly produced from Indian iron ore and measuring up to the Railroad Board Specifications for rails and fishplates. This bounty is to be effective in decreasing amounts up to April 1, 1927.

Consumption of Steel

The Indian Tariff Board indicates that India's present consumption of steel is about 700,000 gross tons annually and prior to the war exceeded 1,000,000 tons annually. In addition to the iron and steel imported, British India uses practically all of the domestic output, with the exception of pig iron and ferromanganese. During the second quarter of 1924, 4086 tons of ferromanganese and 100,135 tons of pig iron were exported from India. Only 52,196 tons of pig iron and 1999 tons of ferromanganese were shipped to foreign countries in the corresponding period of 1923, and during the second quarter of 1922, no ferromanganese and only 16,918 tons of pig iron were exported. Japan has been

the major market for Indian pig iron, but lately the United States has been receiving considerable quantities also.

The large increase in the exportation of pig iron is indicative of the rate of speed at which the domestic industry is forging ahead. The Tata Iron & Steel Co., Ltd., is erecting a modern iron and steel works which it hopes will be one of the largest steel producing units in the world after the materialization of its plans for expansion. The capacity of this company is probably about 650,000 gross tons of pig iron and 425,000 tons of finished steel per annum. In addition the Tata Iron & Steel Co. has interest in associated manufacturing concerns, among which is the Tin Plate Co. of India, Ltd., with a capacity of 3000 tons of tin plate per month.

Possible Large Production

The Bengal Iron Co., Ltd., is capable of turning out 200,000 tons of pig iron per annum and is now melting pig iron at the rate of 150,000 tons annually. The Indian Iron & Steel Co., Ltd., is equipped for the production of about 125,000 tons of pig iron per annum, with a possibility of increasing the capacity of its blast furnaces, if required. The United Steel Corporation of Asia has been formed by prominent British interests for the purpose of erecting a modern steel plant manufacturing all basic steel products. Charcoal blast furnaces operated by the Mysore Distillation & Iron Works at Bhadravati are able to turn out around 22,000 tons of pig iron per year.

British India has very large deposits of iron ore of excellent quality, an abundance of manganese, and clays that make satisfactory firebricks. However, the quantity of coal available for coke manufacture is limited. The use of lower grade coal wherever possible has been advocated as a measure of preserving the coal that is suitable for metallurgical purposes. Freight rates and the availability of sufficient skilled labor at reasonable rates will be factors in determining India's ability to sell steel in world markets in competition with the long established steel producing units.

Plans are being developed by the Aetna Foundry & Machine Co., Warren, Ohio, for the construction of a 50 per cent addition to its machine shop capacity at Warren.

Reduced Rates for Tin, Terne and Black Plate Not Justified

WASHINGTON, Oct. 21.—The Interstate Commerce Commission last Thursday handed down a decision in which it held as not being justified proposed reduced rates on tin, terne and black plate from the Pittsburgh district to the Houston, Tex., district. The schedules suggesting the lower rates were ordered canceled. The present rates, which are to remain in effect, to the Houston group are 80c. per 100 lb. on tin plate and 90c. on the other commodities mentioned. The proposed rates were on tin and terne plate in straight or mixed carloads 76c. and on black plate in carloads, 75.4c. The 90c. rate on terne plate, which also applies on tin and terne plate in mixed carloads, represents the New Orleans combination, and from Sept. 29, 1922, to Oct. 14, 1923, was 76c. The proposed reductions had been made at the suggestion of the Houston Chamber of Commerce and manufacturing consumers in the Houston district who at the conclusion of the hearing in the case announced that in view of a controversy which had arisen they were no longer interested in the proposed reduced rates and desired that the all-rail rates be maintained on a normal all-rail basis.

One of the principal reasons for the changed attitude of the Houston interests was that protest had been made that the establishment of the proposed rates on tin and terne plate would subject Dallas and Fort Worth, Tex., jobbers and manufacturers to competition with Houston jobbers and manufacturers in a large, common territory and to undue prejudice and disadvantage and would prevent the building of a proposed plate manufacturing plant at Dallas or Fort Worth.

Trustees of Central Manufacturing District to Erect Plant for American Bolt Corporation

Business growth and the need of improved shipping facilities have led the American Bolt Corporation to locate in the central manufacturing district of Chicago, where the company has selected a site and approved plans for the erection of a new Chicago warehouse and shop and will lease both land and building from the trustees of the district.

The new plant will be built on West Forty-seventh Street near South Turner Avenue. Land with improvements will represent an investment of about \$230,000. The building, designed by A. Epstein, structural engineer, will be two stories in front and one in the rear, faced with brick and terra cotta trim. It will contain 64,134 sq. ft. of floor space.

The American Bolt Corporation is a consolidation of four of the leading bolt manufacturers in the country, with works at Bayonne, N. J., Columbus, Ohio, and Detroit, as well as Chicago. The Chicago plant formerly was operated by the Boss Nut Co., one of the firms included in the consolidation. The corporation makes bolts, nuts, rivets and boss lock nuts.

Iron Mining in 1923

Iron ore produced in the United States in 1923 amounted to 69,351,442 gross tons, compared with 47,128,527 tons in 1922, according to figures of the United States Geological Survey. Nearly two-thirds of the total, or 44,348,296 gross tons, were mined in Minnesota, Michigan being second with 14,174,468 tons and Alabama third with 6,783,146 tons. No other State reached 1,000,000 tons, Pennsylvania falling just below with 993,441 tons. The figures are exclusive of ore containing 5 per cent or more of manganese. The average value at the mines was \$3.45 per ton, compared with \$3.12 in 1922. Stocks of ore at the mines at the end of 1923 were 10,165,875 gross tons. Production for the year was the fourth largest ever recorded.

Lake Superior ores accounted in 1923 for 59,285,408 tons, or over 85 per cent of the total. Nearly all of this tonnage was hematite, with 59,196,734 tons. The remaining 88,674 tons was magnetite. Of the entire

production for the year hematite is given 65,924,454 tons, brown ore as 1,232,848 tons (with some hematite included in reports from some of the smaller districts), 2,190,624 tons of magnetite and 3516 tons of carbonate.

Shipments from the mines in 1923 are given as 69,811,472 gross tons, valued at \$240,738,921, compared with 50,612,620 tons in 1922, valued at \$157,809,286.

Manganese Ore Imports in Third Quarter

Imports of manganese ore in the third quarter of this year registered a decline of 90,000 tons from the total imports in the second quarter, according to statistics compiled by the Iron & Ore Corporation of America, 11 Broadway, New York. Only 60,229 gross tons of manganese ore was received from all countries in July, August and September, according to these figures. In July shipments totaled 35,156 gross tons; in August, 21,073 gross tons and in September, 4000 gross tons.

The third quarter tonnage was made up as follows: Caucasus, 13,316 gross tons; Brazil, 23,713 gross tons; India, 22,000 gross tons and Porto Rico, 1200 gross tons.

Improvements of Delaware River Steel Co.

Extensive improvements will be made to the blast furnace plant of the Delaware River Steel Co. at Chester, Pa., contracts for which have been awarded to Arthur G. McKee & Co., Cleveland. The hand-filled furnace will be converted into a skip filled unit, the new work including a steel stock trestle with a Baker suspension type of ore storage bins, coke bins, skip bridge, new furnace top with a McKee revolving distributor and electrically operated bell rigs, scale car, skip cars and other auxiliaries necessary to make the furnace modern and efficient. The plant of the Delaware River Steel Co. is the only merchant furnace located directly on tidewater in the United States and in order to provide for the unloading of foreign ores a new dock will be built, the contract for which has been placed with J. E. Brenneman & Co., Philadelphia. On this an ore handling plant designed by the Brown Hoisting Machinery Co., Cleveland, will be operated.

Wholesale Prices in September

After an increase in August prices in September receded in many particulars, leaving an average of 148.8, compared with 100 in 1913, according to figures of the United States Bureau of Labor Statistics. The present figure is 3.2 per cent lower than that for September of last year. Metals and metal products continue to show decreases, standing now, with the exception of the miscellaneous item, at the lowest point of any of the groups. Metal products are 28.2 per cent above the 1913 level, compared with 48.8 per cent for the entire list. Except for foods and chemicals and drugs, all items showed a decrease from the previous year. Details are shown in the table:

Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 = 100.0)

Group	Sept., 1923	1924		Decrease in One Year, Per Cent
		Aug.	Sept.	
Farm products.....	143.7	145.3	143.1	0.4
Foods.....	147.3	144.0	147.7	*0.3
Cloths and clothing....	201.7	189.9	186.5	7.5
Fuel and lighting.....	175.8	169.7	168.0	4.4
Metals and metal products.....	144.1	130.4	128.2	11.0
Building materials....	181.8	169.2	170.7	6.1
Chemicals and drugs..	127.8	130.1	130.6	*2.2
House-furnishing goods	182.6	171.0	171.1	6.3
Miscellaneous.....	120.9	115.0	115.8	4.2
All commodities.....	153.7	149.7	148.8	3.2

*Increase.

Our readers are warned against an impostor using the names Edward Winslow and Jean Oliver, and known also as Raisen and Cline. He has no connection with this office and is not authorized to solicit subscriptions to THE IRON AGE.

Foundrymen Discuss 65 Papers and Reports

Sand and Steel Sessions Center Attention—New Data on
Gray and Malleable Iron—Apprentice
Training Featured

IN several respects the American Foundrymen's Association has never held a greater convention and exhibition than its twenty-eighth, at Milwaukee, last week, Oct. 13 to 16—this was the opinion expressed often by members and exhibitors. It had been 17 months since the convention at Cleveland, early in May, 1923. Since the one at Columbus, Ohio, in October, 1920, this is the first to be held in the fall months. The only other two since 1920—one year having been omitted—were held in the spring at Rochester in 1922 and last year at Cleveland.

The registered attendance at Milwaukee was larger than at any other convention—over 5000—an increase over the best previous figure. This does not include nearly 500 ladies. The central location of Milwaukee tended to draw foundrymen and others from many sections of the United States and Canada. Over 60 Canadians were registered at one booth. The spacious Milwaukee auditorium, with its excellent adjoining halls, meant much for the success of the meeting. Six years ago in the same place the foundrymen held their twenty-third convention.

The international feature was again emphasized by the attendance of several distinguished foreign foundrymen and the presentation of exchange papers by Belgian and French representatives. An unusual program of high-grade papers was attentively listened to and discussed. The exhibition, while not the largest in number of exhibitors, excelled in other respects and was particularly impressive. Foundrymen and exhibitors departed from Milwaukee well satisfied.

Varied Program of Timely Papers

THIRTEEN sessions, including the annual business meeting, were successfully conducted, most of them simultaneously with others, from Monday afternoon, Oct. 13, to Thursday noon, Oct. 16. At these about 50 papers and 15 committee reports were presented and discussed—a formidable achievement. General comment was quite marked this year that the papers were of a high grade, some of the sessions being outstanding in their excellence. Two noteworthy sessions on sand problems drew the largest attendance. Other programs covered three sessions on non-ferrous metals, two on steel castings and one each on electric furnace gray iron, malleable iron, gray cast iron, apprentice training and foundry costs. They are reviewed in the following pages.

Foundry Sands and Sand Research

THE two sessions on sand problems were the best attended of any. Five papers and five committee reports were read and discussed by an enthusiastic audience.

Committee Reports

At the first session on "Foundry Sand," Walter M. Saunders, Saunders & Franklin, Providence, R. I., presided. The first item was the reading of the report of the chairman of the Joint Committee on Molding Sand Research. This was duly referred to the executive committee of the association for action.

Next came the report of the chairman of the Subcommittee on Tests of the Joint Committee on Molding Sand Research. This was read by Prof. Heinrich Ries, Cornell University, Ithaca, N. Y. This report referred to the standard methods of testing molding sand, already published by the association, as well as corrections and additions made subsequent to the date of issue—June, 1924. The subjects of compression and refractoriness were indicated as on the immediate program of work. Refractoriness tests will be made on the "fusing points" of sands, as well as the "softening points" or points of incipient fusion—which is another matter. Further, there will be made a study of the deterioration of sands. The method used is to heat the sand up to 600 deg. Fahr. for 2 hr., and then make the usual tests for quality.

Discussion

Dr. Ries, in the discussion, brought out the fact that, while most of those who had carried through the proposed standard sand tests, by the methods and on

the machines recommended by the committee, obtained excellent results, there were some who had not been so fortunate. These the committee would like to help, if they would make known their troubles.

H. M. Bougher, of the J. W. Paxson Co., stated that it would be difficult to apply the tests in view of the differences in the sands themselves and the various ways in which the sands were dug and blended. Dr. Moldenke objected to the "blending" of molding sands in general, as the mixing of a fine sand with coarse materials were not good for the quality, particularly the permeability of the resulting material. Furthermore, bad material would be mixed with the good and the resulting mixture be worse than if the sands had been kept separate. It further developed, as reported by several of the foundrymen present, that sand-testing according to the methods of the association had saved them many lost castings. Mr. Harrington mentioned that 40 to 100 sand determinations were made daily under his direction, and sand losses had practically ceased. The report was passed on to the board for action.

Work of Geological Surveys

Dr. Ries next gave his report as chairman of the Subcommittee on Geological Surveys. He described the work being done in the several States in which molding sands occur, and what steps were being taken to harmonize the methods of operation used with the aims of the sand research committee. It was slow work, as political bodies cannot act quickly. Many of the samples taken were sent in to the committee for test. So far, 589 tests had been made, and mostly on

sands so far unworked, but sufficiently close to rail transportation to have potential value. The committee asks for cooperation on the part of foundrymen in States where their geological surveys are not active in this direction. The report was sent on to the board.

Prof. H. M. Leighton, chief of the geological survey of Illinois, next discussed the investigation on molding sands of Illinois. Samples had been collected in all counties having sand deposits, as well as taken from 40 foundries, the object being to learn what was wanted. All producing pits were visited and 29 new localities found. The sand resources of the State for molding purposes were established as being between 3 and 9 million tons. One hundred and thirty-nine samples were tested, 42 being from new pits. The foundries of Illinois had cooperated splendidly. Special attention had been given the question of the life of molding sands. In the discussion Dr. Ries offered a resolution urging that Illinois permit the results to be promptly published; this was carried.

Permeability Apparatus

Prof. T. C. Adams of Cornell University presented a paper on the "Development and Comparison of Permeability Apparatus." This was by lantern slides almost wholly. The development of the different types of apparatus step by step here and abroad was shown, and possible improvements indicated. The permeability test is one of the most important of the sand tests and divides itself into the preparation of the sample and the test itself.

Commercial Application of Sand Testing

H. W. Dietert, U. S. Radiator Corporation, then read his paper on the "Commercial Application of Molding Sand Testing." He followed the several tests made on sands with their practical results when standardized for the shop requirements. Thus, for sand-tempering, it made some difference in lost castings whether the sand was either just too dry or just too wet. The relative value of knowing the cohesion and permeability figures of the sand-heaps, as also of the new sand used, was discussed. Also the life of molding sand, as indicated by a heat test of the material under 600 deg. Fahr. for 2 hr. Some interesting figures resulted which gave facts regarding the amount of new sand to be added daily. The author has tried to bring the testing of sand—for his works' purposes especially, to a practical basis, and has so interested the men in charge of foundry operations as well as the molders themselves, in a small molding floor test room that they give the closest attention to the condition of the heaps and facing sands used to make certain of getting good work. The results of the life tests indicate that the loss runs from 20 to 40 per cent, the former for Northern sands, and the latter for the Southern varieties.

Effect of Water on Bond and Permeability

The paper by C. R. Nevin, Cornell University, on the "Relation of Water to Bond and Permeability," was read by Dr. Ries. Mr. Nevin went into the subject of the sand bond, calling attention to the fact that in addition to clay we have silica and iron oxide as bond material when in the colloidal state—or extremely finely divided. The addition of water would make these minute particles act entirely different than when they are dry, the addition of little water causing the bond particles to crawl around the sand grains and thus at once opening up the structure of the sand for the passage of gases. More water would spoil this effect by making the bond material soggy and lumpy. This point was illustrated by lantern slides and gave a good idea of how the original permeability of a new sand is affected by water additions, as well as how "tempering" affects the regular sand-heaps.

Dye Adsorption Tests

R. F. Harrington, W. L. MacComb and M. A. Hosmer, of the Hunt-Spiller Corporation, Boston, gave the results of their studies on the "Effect of Heat on

the Clay Content of Molding Sands, as shown by the Dye Adsorption Tests." Among the many tests made were those by heating the sands at low to very high temperatures, and making dye-adsorption tests of the materials thus treated. These tests were checked up with actual long time runs of the same sands on the foundry floor, the idea being to get at the reliability of such tests.

Discussion

In the discussion that followed the relative values of the cohesion and the permeability tests were weighed, as also the applicability of the dye-adsorption test in general. The consensus of opinion seemed to lie in the use of the dye-adsorption test for bond for checking up new sands, and the cohesion test for the regular sand-heap standardization. H. M. Lane called attention to the differences in sand as used by the foundrymen discussing the subject. A. A. Grubb believed that the dye adsorption would always be used, as it gave a measure of the value of the clay bond. More, however, should be known of the fineness of the clay—its colloidal condition. It was not sufficient to know the fineness of the silica component only. Dr. Ries asked if any other dyes than the class used had been tried out. No information was forthcoming, however, on this point. Mr. Saunders then closed the session with some remarks on the dye-adsorption method and its use.

Grading Molding Sands

On reconvening the following day for the second sand session, Dr. Ries read a paper by C. R. Nevin, Cornell University, on the "Grading of Molding Sands." The unreliability of sand numbers was shown, and it was urged that steps be taken to enable the sand producers to speak in a common language. The foundrymen could then know what they would get in the way of sand fineness when ordering their supply of this basic material. Several methods of grading were indicated, notably one running the range from extra weak, weak, medium, etc., to strong and extra strong. Much was shown by lantern slides of the confusion of grading terms, and attempts to classify the fineness results of tests gave very queer looking curves and complicated tables.

Discussion

In the discussion, therefore, Dr. Moldenke called attention to this ultra-scientific method of approaching a subject of very practical requirements. He urged that all these scientific investigations, certainly necessary to get light on the subject, should, however, be combined with some way to translate the situation into ordinary foundry language so that foundrymen could take with them something tangible even when the elaborate test apparatus was not at hand in their shops. To some of the thousands of foundries for whom this investigation had been made the results were unintelligible. He hoped that a sub-committee would be formed to take the data as fast as obtained and put them into understandable language for the plain foundryman.

Dr. Moldenke was answered by several members of the committee, who assured the foundrymen present that everything was being done to arrive at just such a desirable situation, but the work was not quite advanced enough as yet for this. It would, however, be kept in sight in the future.

New French Mold Hardness Tester

R. J. Doty now took the chair from W. M. Saunders, and called attention to the international aspect of the work being done on molding sands. He introduced E. Ronceray's son, who presented his father's paper on a "New French Mold Hardness Tester." This was an ingenious type of sand Brinell ball tester, which could be placed upon a mold surface and pushed home. The ball, kept outward by a spring, would then make an indentation, the diameter of which could be measured and give a line on the compactness of the sand surface of the mold. Slides were shown as to how the tester could be applied all over a mold surface to get an

idea as to the compression produced by "jolting" up molds in machines, etc.

Discussion

H. M. Lane discussed the instrument, and Dr. Moldenke recalled the fact that the first instrument of this kind was devised over 20 years ago by the late Thomas D. West, and explained and shown at the Indianapolis meeting of the association.

Sand Mixtures and Properties of Molds and Castings

The next paper, by R. F. Harrington, A. S. Wright and M. A. Hosmer, on "A Study of Various Molding Sand Mixtures, together with the Physical Properties of the Molds and the Castings Produced," was read by Mr. Harrington, whose idea was to put the men of the shop to testing the heaps and the operation of the machines with this sand, to get the best results. A number of studies were made with correlated results as to number and kind of castings obtained. Permeability in the sands was found most important, inasmuch as no venting was used at the foundry in question. It should not be lost sight of that whatever the density of the skin of a mold—through graphite coating, the sand behind it must vent well, and that practically altogether to carry off mold gases and not iron gases. They had devised a special machine, by which air was forced through a mold body when placed upon the mold surface, by a small positive blower provided with a manometer to register the pressure required for given permeabilities. The consequence was that no other mold-tester was needed.

The sum and substance of the investigations was that, with the proper kind of sand used, this must not

be maltreated; that good treatment of the wrong kind of sand did not help, either. Further, the standardization of the sand heaps according to the required properties resulted in a marked reduction in machine repair, less castings lost, better castings made. It developed that the sea-coal used could be made much finer and hence go further; 85 per cent of the sea-coal as ground at the plant ran through 200 mesh screens.

A long discussion followed and was participated in by H. M. Lane, W. D. Moore, Eugene Smith, R. F. Harrington, R. J. Doty and others.

Molding Sand Reclamation

F. L. Wolf read his and A. A. Grubb's paper on "Molding Sand Reclamation and Control Experiments." The work for this was done at their plant, the Ohio Brass Co., of Mansfield, Ohio. The steel foundry has the best chance for results along this line. The Dorr Co., with the Eastern Steel Castings Co., have been working on this problem with considerable success. The Ohio Brass Co. now does not discard sand, but reclaims it. The Hunt-Spiller Corporation had done much work in this direction, also looking forward toward synthetic sand-making for their high class work. The paper was not discussed very fully.

Physical Properties of Foundry Sands

A paper by C. A. Hansen, General Electric Co., Schenectady, N. Y., on the "Physical Properties of Foundry Sands," was read by W. H. Dietert, which went thoroughly into the matter from a very highly scientific standpoint. Owing to the lateness of the hour it was not discussed.

Malleable Casting Problems

A WELL diversified program on malleable iron problems was offered in the one session devoted to this industry. Most of the time was given to two subjects: Graphitization of white cast iron and the problem of bringing this about more rapidly, and the use of powdered coal in malleable furnaces.

Rapid Malleablizing and Intermediate Products

A subject around which considerable controversy has waged in the columns of THE IRON AGE and elsewhere, is discussed in the paper by Dr. Anson Hayes, W. J. Diederichs and H. E. Flanders, Iowa State College, Ames, Iowa, entitled "The Mechanism of Graphitization of White Cast Iron and Its Application to the Malleablizing Process." One of the first occasions on which this subject was publicly discussed was the sectional meeting of the American Society for Steel Treating at Moline, Ill., last spring (THE IRON AGE, May 29, 1924) an abstract of the paper then presented being published in THE IRON AGE, June 19, 1924, and various comments by H. A. Schwartz appearing in later issues.

The paper at this convention presented by Dr. Hayes is a further discussion of and contribution to the same subject. The mechanism which the authors explain leads to the belief that complete graphitization can be brought about in much shorter periods than are now the commercial practice. That a whole series of intermediate products of graded physical properties could be produced by only minor variations in the annealing treatment is also indicated. Dr. Hayes's paper reports work done at Iowa State College, which, in combination with reports of work of other investigators, resulted in a theory for the mechanism of complete graphitization of white iron and also reports results of the application of this theory. It is stated that the precipitation of the first ferrite about the primary carbon spot is due to two factors; first, the carbon spot promotes the precipitation of carbon, and second, it acts as an inclusion to promote the separation of ferrite. Eutectoid action after the ferrite envelope is completed takes place by the deposition of ferrite upon that already in the shell, which carbon is

precipitated throughout, forming the small carbon spots. These carbon spots may therefore be considered as evidence of an eutectoid structure. The formation of the ferrite shell around the primary carbon spots, as outlined in the paper, produces the well known "bull's-eye" structure. A series of experiments discussed leads to the conclusion that if carbon is once deposited in poor form, subsequent treatment will prove of no appreciable value in correcting it.

Discussion

H. A. Schwartz, manager of research, National Malleable and Steel Castings Company, Cleveland, very ably discussed this paper, giving the main points in writing. After dwelling on the theoretical metallurgical phase he said, as to the possible intermediate products, that the demand for these would be relatively small. Their machining he considered a drawback. What is really needed is a malleable product having satisfactory shock resistance properties for competition in the field of small steel castings. He recognized the need of rapid graphitization, but he considered this an engineering problem.

Whether X-rays can solve any of the problems in the mechanism of graphitization was brought up by Dr. Ancel St. John, New York, who indicated that this method of analysis will distinguish very small particles, even carbon in the colloidal state. Dr. Hayes agreed that X-ray study would be of great assistance in analyzing the situation, but this has not been possible in his laboratory thus far. Mr. Schwartz added that he had done some work with Dr. E. C. Bain, but the results had not justified talking about, though he had always felt that the X-ray spectrometer could be valuable in some way.

The question of oven atmosphere and the difficulty of graphitizing in hydrogen or in a vacuum was brought up by Prof. Enrique Touceda, Albany, N. Y., who described some of his experiments, particularly the disappearance of the carbon under some conditions. W. R. Bean, research engineer, Eastern Malleable Castings Co., Naugatuck, Conn., declared his belief also that the 31-hr. annealing process is an en-

gineering problem in which the expensive equipment would be a factor in costs or fixed charges. In the East he said the machining problem was the largest one and that malleable castings are the most easily machined of any ferrous metals.

Powdered Coal in Malleable Plants

The experience, after a period of about three years, of the Ohio Brass Co., Mansfield, Ohio, in the use of powdered coal in a new plant making malleable castings was discussed in a paper, "Powdered Coal in a Malleable Casting Plant," by F. L. Wolff and William Romanoff, technical superintendent and metallurgist respectively of that company. Mr. Romanoff presented the paper.

An average ratio of 3 lb. of metal melted per pound of pulverized coal consumed is the testimony of the authors who discuss the theory of powdered coal, factors affecting its efficiency and, finally, furnace operations. They close with the statement that they have recently extended its use to their new boiler plant and that they feel that powdered coal can be used in a malleable plant to the satisfaction of even the most critical.

Discussion

Several representatives of malleable plants conducted a running discussion of various facts in the paper, among these being Mr. Lansing, Lakeside Malleable Co., Milwaukee; W. R. Bean, Eastern Malleable Castings Co.; David McIntosh, Newark Malleable Castings Co., Newark, N. J., and others, including the two authors. It was brought out that in the Mansfield plant no foreign scrap was used and that the amount of pig iron used depended on the scrap available; that if there is a decrease in oxidation loss as a result of powdered coal, less pig iron is necessary; that the cost of pulverizing varies, it being \$1.65 per ton at the Mansfield plant. One speaker testified that comparing pulverized and hand-fired equipment, he had found that about 33 1/3 per cent of the charge could be pig iron in the former, but 45 to 48 per cent was necessary in the latter. W. R. Bean agreed that pulverized coal has a place in melting and annealing malleable castings, but that, with the high cost of installation, foundrymen must consider all phases carefully. A small plant can not come down to the figures usually given.

Broadening an Industry's Horizon

The three papers scheduled were supplemented by a fourth one, not on the program nor preprinted, on

"Broadening an Industry's Horizon," by A. L. Eschman, Cleveland, Ohio. It was an excellent review of the progress in research in the malleable industry and a recital of some of the achievements. He showed how the constant demand for better castings had been met in the establishment of higher specifications. He discussed some of the fallacies which had been disproved by research, particularly in that the value of such castings lies on the surface alone. He discussed the large field for malleable castings in that these could meet the requirements of strength combined with easy machining, shock and rust resistance, etc., and that in the automobile of today there are 200 to 250 lb. of such castings besides a large quantity used in motor trucks. He pointed to the establishing of voluntary standards and quality as a striking example of group effort in raising the standards of an industry.

Oxidation Losses in Air Furnace Melting

In a contribution entitled, "Oxidation Losses During Air Furnace Melting of White Cast Iron," the author, H. A. Schwartz, Cleveland, gave the results of a study of the composition of air furnace slags obtained under various degrees of oxidation in the oil fired furnaces at the Iowa Malleable Iron Co. The bearing of these observed compositions on various hypotheses regarding the mechanism of slag formation is pointed out, although no definite conclusions have been drawn regarding the physical chemistry of the process. It is hoped that besides the use made of the data in the present paper, the observation may be of service as a record of slag compositions, for the benefit of future workers in the same field. The foundryman may here find information regarding the loss of iron by oxidation, during melting. A method is also suggested for determining the magnitude of this loss, independently of any knowledge of the weights of good and bad castings, sprue, and melting stock. The method of determining oxidation loss by the difference between the weight of metal charged, and that recovered, is too inaccurate to give usable results.

Committee Reports

Prof. Enrique Touceda presented a brief report of the work of the A. F. A. and A. S. T. M. committees on malleable cast iron which contained nothing new since the convention report at Atlantic City last June at the annual convention of the A. S. T. M. (THE IRON AGE, July 3). The incorporation of a yield point minimum had been advocated and was being considered as well as specifications for several grades of malleable iron as advocated by Dr. Richard Moldenke.

The Steel Foundry Sessions

"THE best program ever presented at steel foundry sessions" was the opinion of a foundry metallurgist who has attended many conventions. In quality and in the variety of the subjects the papers were unusually distinctive. Two sessions were devoted to the steel foundry at which six papers and four committee reports were presented and discussed.

Interest centered in two papers in particular: "The Microscope as a Controlling Instrument in Annealing Steel Castings" and "Notes on the Performance of Acid Electric Furnaces."

The Microscope and Annealing

The paper on the importance of metallography in the heat treatment of steel castings was written by J. Fletcher Harper and H. J. Stein, the Allis-Chalmers Mfg. Corporation, Milwaukee. It was presented by Mr. Stein. A strong plea is made for a much greater use of the microscope in controlling annealing. Emphasis is put on the fact that on large castings in particular the coupon does not represent the body of the metal and is a poor guide as to the properties of the casting itself. Based on this argument the authors recommend a special method of heat treating large castings in which spheroidizing of the cementite in the pearlitic

constituent with consequent increase in the ductility is the important phase. At the Boston convention of the American Society for Steel Treating in September (THE IRON AGE, Oct. 2), Mr. Harper developed this subject in detail in a paper "Spheroidization of Cementite in Hypoeutectoid Steels." The recommendations of the authors involve really a triple annealing. The papers are replete with photomicrographs.

Discussion

Criticizing to some extent, though highly commending the paper as a whole, John Hoen Hall, chief metallurgist Taylor-Wharton Iron & Steel Co., High Bridge, N. J., said that one photomicrograph (Fig. 8) was very far from satisfactory, to which the authors' reply was that in this case the mass of the metal was the reason. Spheroidizing of the cementite was still necessary.

Reinforcing the authors' contentions A. W. Lorenz, Bucyrus Steel Casting Co., Milwaukee, explained that the first high temperature was employed to reach the center of the casting, the second temperature to obtain small grain size and the third the usual step in double annealing. W. J. Priestley, sales engineer, Union Carbide & Carbon Co., Pittsburgh, cited a case where coupons on 15 to 20-ton castings passed specifications

after double heat treatment but that coupons from the interior did not pass.

Acid Electric Steel Practice

Recognized as unparalleled in the practical data which it contains, the paper by T. S. Quinn, treasurer, Lebanon Steel Foundry, Lebanon, Pa., was unusual. It was presented by the author and special attention was called to it by the chairman of that session, A. H. Jameson, Deemer Steel Casting Co., New Castle, Del.

Complete data covering a period of two years' operation of two 2-ton Heroult electric furnaces, acid-lined, as well as details of the conversion cost per ton of steel in the ladle by months over that period, are the features of the paper. The value of these data is realized in that they reflect the results of two years' furnace operation in a typical steel foundry manufacturing small steel castings as affected by these fluctuations in production which occur simultaneously with the high and low points of the company's order books. An important conclusion from the company's experience is that, for conditions obtaining in its foundry, it is better to operate both furnaces single turn than to incur the expense of setting up a night force with its disadvantages in smaller output, etc. A careful reading of the paper is necessary.

That the paper by Mr. Quinn is a "classic" was the opinion of John H. Hall, the able chairman of the session, who said also that costs such as these had been based on opinion in the past but in this contribution costs are founded on cold facts.

Discussion

A very interesting discussion on certain points in furnace practice followed. W. J. Priestley, after highly commending the paper as giving facts hitherto unobtainable, brought up the question of nascent silicon. In his experience, picking up silicon as nascent silicon, instead of obtaining all the final silicon content by direct and immediate addition of ferrosilicon resulted in non-solid steel, though the metal appears solid in test molds. In high temperature melting it is better to get a good action on the bath, after a low silicon content, than to add 30 to 35 points of silicon. This was corroborated by S. C. Johnson, who said that increased power consumption resulted from the opposite practice. To this Mr. Quinn replied that silicon control is necessary but that if a boil is obtained by adding ore, a varying silicon content results.

The advisability of the use of lime in acid electric practice was touched upon by Mr. Priestley also in his discussion when he said that he had found that higher than 2 per cent lime was feasible and that lime up to 15 to 20 per cent was possible without cutting the linings. There is the added advantage of some reduction of the sulphur. Some objections to certain results of the use of high lime were offered by Mr. Quinn, who said that a watery slag resulted which in his experience was objectionable on small castings.

Attention was also called by Mr. Priestley to the high manganese content of the steel made, regarding this as especially beneficial when the sulphur is also high as in this same steel. In explaining this Mr. Quinn expressed his dislike for high sulphur but in his case it was the machining qualities of his product which were a large factor.

Alloy Steel Castings

"Broadening the Field for Steel Castings Through the Use of Alloys and Heat Treatment" was a valuable paper by F. Grotts, Holt Mfg. Co., Peoria, Ill. The author, who presented his paper, cited as proof of these possibilities the fact that great strength, resistance to shock and wearing qualities can be obtained with small costs and practically no change in machinability. The alloys recommended are chromiums and nickel as well as vanadium and molybdenum in special cases. The author contends that it is practical to quench and draw high carbon and alloy steel castings, that castings should be annealed before being treated, that practically any analysis can be controlled within specification limits, that alloy steels are used for chains,

boiler heads, frogs, switches, dredging machinery, ordnance work, hydroelectric castings, etc. Charts of the physical properties of certain alloy castings are given.

The author supplemented his paper by the statement that some very interesting castings have been made containing chromium and molybdenum which can be successfully quenched in water whereas the plain chromium alloy castings cannot. The yield point in these has been found close to the ultimate strength. He also spoke of an alloy casting containing chromium, nickel and manganese which has been found resistant to abrasion among other interesting properties. Combinations which have air-hardening properties were also mentioned.

Electric Heat Treatment of Valve Castings

Three methods of electrically heat treating valve castings of steel were discussed in a paper, "Heat Treatment of Steel Valve Castings in the Electric Furnace," by V. T. Malcolm, and A. Spout, metallurgical engineer and superintendent respectively, Chapman Valve Co., Indian Orchard, Mass. The first method is straight annealing, the second is to heat to 1650 deg. Fahr. for 2 hr. and quench in still air at once. The third method is called a modified normalizing, the details of which are given in the paper. It is claimed to result in remarkable physical properties. The absence of scale from electric heat treatment is emphasized.

X-Rays in the Foundry

Dr. Aniel St. John, consulting X-ray metallurgist, New York, delivered an interesting address, accompanied by apparatus to demonstrate the operation of the X-rays, on the practical use of these rays in steel foundry operations. His paper, "X-rays in the Foundry," is well illustrated with X-ray photographs of steel castings. Dr. St. John believes decidedly that these rays can be of service to foundrymen in two ways: To coordinate the work of the designing room and foundry and for routine inspection of castings where much expansion work is subsequently to be done on the castings.

Organization and Practice in Finishing Department

A paper, "Organization and Practice in a Steel Foundry Finishing Department," by Charles W. Heywood, Burnside Steel Co., Chicago, was presented in abstract by A. W. Gregg. In brief the author says:

As the finishing department of a steel foundry is composed almost entirely of common or semi-skilled labor, therefore the efficiency with which it is run depends to a large degree on skilled direction and management. The gang system, in the writer's opinion, produces the most satisfactory results from the standpoint of both output and costs. Where the gang system is not feasible, another successful plan is to employ a pace maker. The layout of equipment has a great deal to do with the best routing and these two features are discussed in detail. To avoid delays and loss of tools, every finishing department should have a tool room in charge of a good man. The best inspection is secured when every operator is trained to inspect his own work with the foreman acting as final judge if castings are to be rejected. One of the best ways of reducing costs is to furnish the department foreman with an itemized statement of cost of production semi-monthly. Some shops have been very successful in reducing costs by paying a higher rate of wages, thereby securing better workmen and having them satisfied.

Discussion

A written discussion by J. T. Towne, Dayton Steel Castings Co., Dayton, Ohio, was read by Mr. Towne in which, among other things, he took exception to the gang system and the pacemaker and asserted that time studies are better than either.

Committee Reports

Nothing particularly new was contained in the reports of several committees, most of which work jointly with the A. S. T. M. and other societies. The report of the committee on steel castings was presented by

A. H. Jameson and that on refractories by C. M. Ring. In the latter the suggestion that the various committees in this field should coordinate was heartily seconded. Too many rebuffs have been the experience of some of those attempting to obtain information. The report

of the A. F. A. representation in the committee on Joint Investigation of Phosphorus and Sulphur in Steel was presented by R. A. Bull, who said that it would be a long period before steel castings would be reached in the investigation.

Cast Iron from Electric Furnaces

FOUR papers and two committee reports made up the program at the one session devoted to electric furnaces and cast iron. It was presided over by L. L. Anthes, Anthes Foundry, Ltd., Toronto, Ont.

Gray Iron Made Electrically

A paper on Electric Furnace Gray Iron by Edwin L. Wilson, F. J. Ryan & Co., Philadelphia, was read by G. K. Elliott, the Lunkenheimer Co., Cincinnati. This discussion was a survey of the results of an experimental run of synthetic gray iron made in an electric furnace from steel scrap. The work was conducted at the plant of the Connecticut Electric Steel Co., Hartford, Conn., in the fall of 1922.

In an acid-lined furnace 225 gross tons were produced and using the basic process, 93 tons were made. The author concludes that the difference between the delivered price of pig iron and the sale value of steel scrap must be greater than the normal spread in New England to make the production of synthetic pig iron for sale to iron foundries possible commercially. A sufficient spread, however, exists in the Far West and in sections of the Middle West where the freight on pig iron is high and that on scrap prevents its return to the steel-making centers. The process offers commercial possibilities for central stations having excess off-peak power so situated that suitable steel scrap is available and in reach of a market for pig iron. The process is adaptable for the purpose in that it is not necessarily continuous but may be operated to accommodate the periods of low load.

Synthetic gray iron poured directly produces castings having physical strength and toughness far in excess of the best cupola iron, and its chemical analysis shows possible reduction of impurities far below the limitations of the cupola. Reports from foundries which used the pig iron produced in this run, however, indicate that the superior quality of synthetic iron is largely lost when the iron is remelted in the cupola.

The author compared the different results obtained from the acid and basic lined furnaces, emphasizing the refining reactions possible with the basic lining. He also pointed out the greater flexibility of the electric furnace as compared with the cupola. The various percentages of carbon, silicon, manganese, sulphur and phosphorus which have become standard practice in iron foundries are a compromise between the results obtained and the limitations of the cupola. The electric furnace is not subject to those limitations, inasmuch as its atmosphere is reducing rather than oxidizing; hence the charge is not contaminated by contact with fuel and flux. Likewise it is not hampered by a relatively low limit of temperature. It offers a handy means of producing small heats of special composition to meet special requirements. It opens up wide possibilities for utilizing the beneficial properties imparted by definite quantities of alloys, such as chromium, nickel and the rarer elements, such as vanadium, tungsten and molybdenum.

Iron Pipe from Electric Furnaces

The "Electric Furnace in the Pipe Foundry" was the subject of a paper by James T. MacKenzie, chief chemist American Cast Iron Pipe Co., Birmingham. The author explained that in 1919, following the withdrawal of the Government from the market, it seemed desirable to lower the cost of pipe to the consumer and it was thought that this could be accomplished by reducing the metal thickness of the pipe which, in turn, called for an equivalent increase in the strength of the metal. Furthermore, less metal in the pipe would also mean a considerable reduction in freight which, in many cases, was one-third the cost to the consumer.

An electric furnace was installed and it was charged with direct blast furnace metal and cupola-melted steel scrap. The scrap, which was necessary to increase the strength of the metal, offered the additional advantage of approximately \$10 a ton in price, as compared with pig iron. The furnace was operated until March, 1921, when the price of pig iron had declined so much more than scrap that the difference between the two was insufficient to cover the cost of operation.

Synthetic Foundry Iron

The successful production of synthetic foundry iron on the Pacific Coast was described by C. E. Williams, U. S. Bureau of Mines, Seattle, Wash., in a paper "Synthetic Foundry Iron." In that section of the country, he pointed out, steel scrap and electric power are relatively cheap while blast furnace pig iron is high. Experiments were conducted with an acid-lined electric furnace at Vancouver, using it for gray iron jobbing work when not employed in the production of steel castings. It was found essential to have good contact between the steel scrap and carbon in the charge. This means that slag must be kept down to the minimum, as a coating of slag over the metal prevents carburization. It is also essential that a carburizer be used which is as free from ash as possible, as ash forms a coating on the carbon, preventing free reaction between it and the steel. With proper care, however, free carburization is attainable, materially reducing the amount of power and coke or other carburizer required, as well as the amount of labor and the time of operations. The cost of iron in the ladle, it was found, was only three-quarters the previous cost of metal from the cupola. The grain was denser and finer than that of the cupola iron. Likewise the strength was greater and toughness and impact value superior.

Discussion

In discussing Mr. Williams' remarks, George E. Lamb, Lamb Machine Co., Hoquian, Wash., recounted the experience of his company in making synthetic gray iron in an acid electric furnace. Inasmuch as there was insufficient steel castings business to warrant continuous employment of the furnace and power charges accumulated during idle as well as active periods, it was decided to do jobbing work in gray iron to supplement the regular work. Chilled car wheel scrap is bought from neighboring logging camps at a low price with practically no addition in freight. For carburizing material, broken electrodes are ground up. A gray iron heat is generally taken at the close of the day after completing the steel heats. As it is important that no carbon be left in the furnace to spoil succeeding steel heats, a bath of molten scrap is allowed to accumulate on the bottom of the furnace before carburizing material is added. After pouring, all loose material is scraped from the bottom to insure removal of carbon. Only one cast iron heat is taken between steel heats, because the taking of three consecutive iron heats resulted in consequent difficulties from too much carbon in succeeding steel heats. Mr. Lamb stated that 2400 lb. of iron was melted in the most recent heat taken.

R. E. Kennedy, National Cash Register Co., Dayton, Ohio, stated that his company had made synthetic low phosphorus pig iron in 1916, 1917 and 1918, having taken 700 heats yielding 4500 tons. After considerable experimentation the company settled on a practice of using a lime bottom sintered in. The charge consisted of wood charcoal mixed with shell steel turnings and no trouble was experienced in obtaining the percentage of carbon required. In those years low phosphorus pig iron cost from \$65 to \$70 a gross ton

delivered, while the synthetic product was made in the electric furnace at \$45 a ton. When the blast furnace product declined below the cost of making synthetic pig iron the practice was discontinued.

Lewis D. McClaren, Indiana Coke & Gas Co., Terre Haute, Ind., pointed out that there is an increasing scarcity of petroleum coke, due to the heavy demand from the radio industry which utilizes that material for the manufacture of dry batteries.

H. B. Swan, Cadillac Motor Car Co., Detroit, stated that it does not matter whether petroleum coke or some other type of carbon is used in the electric furnace for the manufacture of gray iron, so long as the ash content is low.

Mr. MacKenzie stated that dead killed electric furnace gray iron requires much more silicon and a higher pouring temperature to produce the same grain found in cupola metal. In this connection he called attention to the theory recently advanced by Japanese investigators that a certain amount of oxygen is necessary in the metal to promote graphitization.

Committee Report on Corrosion of Gray Iron

A report of the committee on corrosion of ferrous metals was presented by H. Y. Carson, chairman, of the American Cast Iron Pipe Co., Birmingham. Generally accepted assumptions regarding the corrosion resistivity of different types of cast metal have never been demonstrated and for that reason the committee undertook experiments at the laboratory of the American Cast Iron Pipe Co. under the direction of J. T. MacKenzie, chief chemist. It has been assumed, for instance, that close-grained cast iron will resist corrosion better than open-grained metal. While the experiments made are not considered conclusive, they at least cast doubt upon this general belief. The main purpose of the work was to devise some satisfactory method for making short-time corrosion tests. A detailed description is given of the test together with the results so far achieved. It is of considerable interest

to note that the average results from the quick time spray test are approximately 10 times the average results from soil corrosion as thus far determined through experiments conducted by the Bureau of Standards.

Mr. Carson also read a paper prepared by K. H. Logan, Bureau of Standards, Washington, D. C., on the soil corrosion investigation which has been undertaken by that organization. Various kinds of pipe materials and cable, with and without protective coatings, have been buried in 46 different locations throughout the country in soil regarded as typical of each section. Various kinds of sheets, as well as brass pipe fittings, were buried in the same manner. The first specimens were buried March 1, 1922, and the burying of specimens continued irregularly throughout most of the following year. Six identical groups of specimens were buried in each location so that a group could be removed from time to time and the progress of the corrosion observed without interfering with the specimens to be uncovered later. The results of the examination of the pipe materials removed thus far are not such as to justify definite conclusions concerning the relative merits of any materials under test or as to the life of the specimens in any particular soil.

W. R. Bean, Eastern Malleable Iron Co., Naugatuck, Conn., told of air exposure and ground tests which had been carried on by his company for the past 16 years. Malleable iron, gray iron, cast steel and wrought iron plates of identical dimensions have been subjected to both tests. At the end of 16 years gray iron showed a loss in weight of 3.05 per cent, malleable iron 2.11 per cent, cast steel 2.19 per cent and wrought iron 3.07 per cent from exposure to the air. Gray iron buried in the ground showed a loss of 0.73 per cent, malleable iron 0.56 per cent, cast steel 0.66 per cent and wrought iron 0.66 per cent. The samples have been taken up, brushed and weighed each year, so that conditions of service have not been duplicated as is the purpose of the soil corrosion test undertaken by the Bureau of Standards.

Costs in the Foundry

ONLY two papers and two committee reports were discussed at the one session on foundry costs. Its chairman was C. B. Connelley, Carnegie Institute of Technology, Pittsburgh.

Finding the Cost

"Cost Finding in a Foundry" was the subject of a paper by W. J. Corbett, Electric Steel Founders' Research Group, Chicago. The facts necessary for an analysis of the business of a foundry cannot be obtained from a bookkeeping system alone, he said. The existence of a foundry is justified only by its ability to create a satisfactory return on the capital invested and employed in the business. In order to do this it is of the utmost importance that those in control of the business know and analyze all the elements of cost incurred in producing castings. They must be able to give reasons why expected results are not obtained and to determine the procedure necessary to remedy such conditions. When the operations of a foundry are not profitable, antagonism or lack of cooperation is apt to develop between the producing branch and the selling branch, and this is particularly true when no facts are available to determine definitely where the fault lies. A remedy lies in the use of costs for a guide by both the operating and sales departments.

The uses of an effective system of costs in a foundry are summarized as follows:

To ascertain the cost of making castings; to measure the efficiency of labor; to ascertain the consumption of materials and supplies; to serve as a guide for correcting faulty operating methods; to provide the stimulus of chronological comparative records, and to furnish data for intelligent merchandising. A comparison of figures based on methods used in some 80 steel foundries shows great variations in ascertaining casting costs and emphasizes the importance of adopting uniform cost-finding methods. A general cost accounting system for a foundry is outlined. Likewise

a detailed description is given of a job cost system which furnishes the necessary data that should be supplied by good foundry cost systems.

Costs in Various Departments

"Departmental Costs in the Foundry" was the title of a paper by Howell B. May, W. K. Henderson Iron Works & Supply Co., Shreveport, La. Mr. May explained that his paper was a summary of a standard cost system prepared some years ago for the American Foundrymen's Association and published in full in the society's *Transactions*, Volume 28. Emphasis is placed on the careful analysis of each department of the foundry to determine a correct basis on which to distribute the burden. This can be done only by a man who has practical knowledge of organization, production control, management, shop operation and material handling, as well as a knowledge of the principles of cost accounting. A cost plan to be of the greatest value must be designed from the engineer's point of view rather than from the accountant's. The average accountant does not have years of practical shop experience which are essential in making the correct analysis of operating conditions, a prime requisite in the design of a cost plan. General accounting shows the total profit or loss of the business as a whole; engineering or departmental costs shows a profit or loss on each unit, whether the unit be the job, contract, line of product or operating department. With the ascertainment of departmental cost, profitable and non-profitable lines are clearly recognized, thus enabling the sales department to choose the line for its greatest effort. Non-profitable lines are sometimes retained for the following reasons: For their advertising value; for the purpose of completing a line; for the accommodation of substantial customers of the profitable lines, and for maintaining production in slack seasons

(Continued on page 1104)

Urges Extending Application of Gears

Finding New Uses Discussed at Meeting of Gear Manufacturers'

Association—Cost and Apprentice Methods—Progress

Reported by Standards Committees

INITIATIVE in extending the application of gears was urged by T. C. Roantree, Westinghouse Electric & Mfg. Co., East Pittsburgh, in an address on "New Gear Applications" given before the semi-annual meeting of the American Gear Manufacturers' Association, held at Briarcliff Lodge, Briarcliff Manor, N. Y., Oct. 16 to 18.

The meeting was well attended. Addresses were made on a variety of subjects, and the progress reports submitted by the several standardization and other committees were actively discussed.

"In the past," said Mr. Roantree, "gears came into general use principally because they were specified for a particular device. The continued appearance on the market of new products carried with it additional uses for gears. As the orders came to us we complacently filled them without thought as to whether more gears could have been used in the device or whether the gears used might be designed and assembled so that they would function better."

Taking a professional interest in the exact application to which the gears were to be put would, it was thought, assist in making more efficient the device in which the gears are used, resulting in a greater sale of that device with a corresponding increase in orders for gears employed in it.

It was emphasized that in the past not only were gears less extensively used than at present, but knowledge of what constitutes a good gear, the methods of producing it, and the proper application of the various types were not as well known as at present. The gears being made today were characterized as far superior to those made five or ten years ago, the advancement in gear making machinery and the standardization of gears being given as paramount reasons for the increased efficiency of the present-day gears. Heat treating, and the methods of inspection and testing of gears for physical properties and accuracy of tooth form, spacing, and proportion were also emphasized as factors in the relative perfection of the gear of today.

The demand for quiet running gears in the equipment of manufacturing establishments, making for more agreeable working conditions and better production, was stressed. Of the essential conditions for a quiet running gear train, correct profile, contour, proper alinement and careful assembly were said to be outstanding. Proper alinement and assembly is usually the responsibility of the maker of the device in which the gears are employed, but quiet meshing of the gears, it was emphasized, cannot be obtained unless the gears are properly manufactured. The fact that the gear makers have erred in many cases was said to be demonstrated by the appearance of non-metallic gear material and the growing use of the chain drive.

Mr. Roantree held that there are many metal gear applications in which a chain or belt drive is used, because the manufacturer furnishing the gears for that application could not attain the quality necessary to provide quiet meshing of the gears. "There are several applications in which the non-metallic or the chain drive can better serve the purpose than a metal gear, he said. But we are to blame for the loss of considerable business because of the inaccuracies we have permitted to enter into our product—business lost because of our inability a few years ago to manufacture gears as nearly perfect as we can today."

Insufficient Publicity Given the Gear Progress

The insufficient publicity given to gear making and to the progress it has made during recent years, was particularly stressed. Concerted action to bring before

the public in systematic sequence the advance in the perfection of gears should, he thought, assist in future gear applications. "With such a position in the public eye we would not only reach the laymen interested in improved working conditions and products, but the designer and inventor, who will give greater consideration, to the possibilities of gearing in his final arrangement," he said. This, it was thought, would create a demand for gears where otherwise some substitute might be employed.

Intensive consideration to possible uses for gears in the many new mechanical products being developed was urged, as well as attention to further uses in products that have become more or less standardized. Improved mechanical devices in agriculture were thought to offer an opportunity, as well as additional application of gears in mechanical devices for domestic use.

The advantages of economy in floor space in the use of direct motor and gear drive over the belt drive and the expense and danger in the use of overhead shafting should be presented, he said. The use of the helix angle, when end thrust is permissible, as a substitute for straight spur to effect more quiet operation, and the employment of hardened and ground spur gears where they can be used to advantage, should be promulgated. The use of worm gears should be recommended, he said, as a substitute for bevel gears in right angle drives when there is greater efficiency in their application.

Mr. Roantree thought that the association should investigate various fields for better, further and new uses for gears. A certain member company could, he indicated, be designated to specialize investigation into agricultural applications, others in the mining, automotive, and other fields. The object of such an investigation, he said, was the "making two blades of grass grow where but one had grown before."

Outlines Method of Recording Costs

A method of recording shop and complete costs, which has been employed by his company for more than six years with highly satisfactory results, was outlined by Thomas Haley, Fawcus Machine Co., Pittsburgh, in an address on "Shop Costs."

In this plan labor is charged directly to the jobs in production. Shop overhead cost, which is under the direct control of the operating executive at the time of the incurring of the expense is prorated over jobs on the basis of predetermined rated machine hours. Rated machine hours are determined by a survey of the entire plant and equipment, and the subsequent classifying of producing machines and facilities on the basis of their relative position to the whole scheme of operations. Ratings are established by determining the cost of operating full time, a bench hand fitter or machine. The cost includes depreciation on buildings and equipment, insurance and rent, all apportioned by square feet of floor space occupied; it also includes depreciation on tools, power cost apportioned by rated horsepower and small tool expense at cost. Cost other than shop cost is under the direct control of the managing executive, and is prorated over operations on the basis of productive hours.

The total cost thus obtained is assembled monthly on the job unit basis, and is referred to the various departments for examination and guidance in future activities. Completeness was stressed as the primary essential of a cost system, this being obtained only by positive ledger control of items making up the cost structure, and being easily established by proper

accounting methods. This method, which was said to have proved highly satisfactory over a period of six years, was recommended to earnest consideration.

Training of Mechanics Discussed

A paper that was received with interest was on the question of "How Are Our Future Mechanics to be Trained?" by Erik Oberg, editor *Machinery*, New York. The problem was said to be one that has to be solved gradually, the methods of training varying with the size of shop, product manufactured and other conditions.

Four distinct methods by which the future workers may be trained were reviewed briefly. The first method outlined was the regular apprenticeship, amplified to meet present-day conditions, the method of the Warner & Swasey Co., Cleveland, which has been maintained continuously for 40 years, being discussed as an example of a successful system. This company trains 100 apprentices when operating at capacity, and never less than 50 even in dull times. The modern apprentice system to be successful should, it was said, add to the shop training carefully supervised classroom instruction, given in the plant and on the company's time. It was emphasized that the system adopted, to be successful, must not be along old-fashioned lines where the boy is simply turned over to a foreman and no further interest taken in him.

The trade school and the cooperative high school methods of training mechanics were reviewed. In the latter, the cooperative educational method, the schools are maintained by the community as part of the public school system in cooperation with manufacturing plants. Two groups of apprentices spend alternately one or two weeks in the school and a corresponding period in productive work in a commercial machine shop. The boys work in pairs and when one boy is in school another is in the shop, the manufacturer always having one of the two boys at productive work. The cooperative course inaugurated at Springfield, Vt., 11 years ago, was outlined. In conclusion it was said that this method of training mechanics would without doubt, play an important part in the future. It was said that if the simplicity of this system and the comparatively small cost to the community were better known, more of these courses would be adopted in all parts of the country.

The vestibule school or shop training department was the fourth method of training discussed. This system, which is not intended to train all-around mechanics, but simply operators of some one line of machine tools, was characterized as far superior to the method of merely placing the man in the shop under the supervision of a foreman and expecting that he will become a good operator without any systematic instruction. A difficulty of the system was said to be in finding good teachers.

Advantages in Use of Spur Gear Speed Reducers

The construction, use and advantages of spur gear speed reducers were outlined briefly in a paper by Warren G. Jones, W. A. Jones Foundry & Machine Co., Chicago. The title of the paper was "Spur Gear Speed Reducers. What are they? Why and where are they used?" A surprisingly large number of engineers, it was said, have but a faint idea of what this mechanism is and the reasons for its growing popularity.

The speed reducers were described as totally inclosed spur gear drives designed to decrease or step down speeds between electric motors and comparatively slow moving machines. They are manufactured in a wide range of standard sizes, horsepower capacities and reduction ratios to meet all ordinary conditions of service. There are two general types in one of which the high and low speed ends are concentric, providing a straight line drive. In the other type the high and low speed shafts are not concentric, giving an offset drive.

Spur gear speed reducers, which have been manufactured for about 20 years, were said to owe their early popularity, if not their actual existence, to the cement industry. Because of the destructive action of the cement dust, exposed gear drives quickly deteriorated and the inclosed speed reducer was developed. The advantages of the inclosed reducing mechanism to other industries were discussed, economy of space being stressed as an important consideration in many plants, as well as the safety feature provided by the inclosed construction, which reduces the accident hazard. The gears running in an oil bath and under dust proof conditions was pointed out as assuring positive lubrication at all times with a minimum of attention. The self-lubrication feature was characterized as having proved particularly important in obtaining acceptance for the inclosed reducer idea. The compactness of the reducers, eliminating interference with the diffusion of light and thereby assisting in making the factory more attractive, was also a feature emphasized. As to the cost of installation, it was said that the reducers were not more expensive than other methods of obtaining reduced speeds, when the complete job, installed and ready for operation, is compared. It is true, said Mr. Jones, that cost of various units such as gears, belts, ropes and shafting, etc., may be lower, but the cost of laying out, assembling, installing and adjusting these various units must be considered. The inclosed speed reducer was claimed to have an advantage in the cost of upkeep. The motor and reducer being mounted on a single base and connected to the final drive by a flexible coupling, alignment and bearing troubles are eliminated from the start, he said.

Transmission with Roller Clutch Feature

A paper under the title of "The Trend of the Transmission" by W. A. McCarrell, engineer, Milwaukee, was devoted particularly to describing a type of automobile transmission the gears of which are constantly in mesh. They are connected to their shafts by roller clutches of a special type which are operated by sliding collars. It bears considerable resemblance to the conventional three-speed and reverse type in that the gears are arranged in the same order from front to rear. Shifting of the gears is by the usual hand lever, the gear positions being the same as with the conventional transmission. Ease of shifting under all conditions, quiet operation and simplicity, which permits of economical manufacture, were features emphasized. The paper was read by S. O. White, Warner Gear Co., Muncie, Ind.

An address by Arthur J. Baldwin, McGraw-Hill Co., New York, dealt with bettering business by raising the standard of living—creating new wants—both at home and abroad.

Progress Reported in Gear Standardization Work

ALTHOUGH the reports submitted by the several standardization committees of the association showed definite progress, no standards nor recommended practices were voted upon. A feature of the meeting was a technical standards session, presided over by B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, chairman of the general standardization committee. The meeting followed dinner and at the separate tables arranged for each committee plans were formulated for intensive work in the next six months. It is expected that standard practice recommendations of wide interest will

be presented at the next meeting. In his opening address, President George L. Markland, Jr., Philadelphia Gear Works, Philadelphia, reviewed the accomplishments of the association since its beginning, stressing particularly the standardization work. He urged the members to greater activity, pointing out the interest of other organizations both at home and abroad. B. F. Waterman, in his report as chairman of the general standardization committee, outlined the difficulties in the standardization work and stressed the necessity of co-operation from all members of the association. He

pointed to the large amount of work that had been done by the various committees, summarizing briefly the important accomplishments reported at the last meeting at Buffalo. The generous financial support given by the member companies of the association to the gear research committee was emphasized as evidence of the active interest of the membership in the standardization work. On motion of the president a rising vote of thanks was tendered Mr. Waterman for his part in the administration of the standardization work of the association.

The report of the association's representatives of the A. S. M. E. research committee on gears, which was read by E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., revealed that the gear tester designed by Dr. Lewis to be used in the research to determine the effects of speed and load upon gear teeth would be ready by Nov. 1. Contributions by members of the A. G. M. A. have amounted to \$1,625, and interested companies have contributed \$1,100 through the A. S. M. E. The Engineering Foundation has agreed to contribute \$1,000 for two years. Machine tool builders will be solicited, it was said.

Recommendation by Metallurgical Committee

A recommendation to revise the steel castings specifications to a range of 0.40 to 0.60 per cent manganese instead of 0.30 to 0.60 per cent for both case hardened and heat treated gears will be submitted to the membership by the metallurgical committee, of which C. B. Hamilton, Jr., Hamilton Gear & Machine Company, Toronto, Canada, is chairman. In the carbon steel specifications for forged and rolled steel, it was recommended to discontinue S. A. E. 1015 low carbon case hardening steel, which leaves the S. A. E. 1020 steel. It is planned to present something on the economic factors governing the choice of bar stock, open hammer forgings, drop forgings and upsetter forgings at the next meeting. Material on the design, construction and operation of furnaces for the heat treatment of gears is also planned.

The worm gear committee, of which J. C. O'Brien, Pittsburgh Gear & Machine Company, Pittsburgh, is chairman, reported progress. It is expected that at the next meeting more recommendations will be made as to the design of the worm wheel to permit the present hobs to be used to advantage. In a questionnaire to be submitted, the membership is to be sounded as to whether they prefer the use of the diametral or circular pitch in tables of worm gear elements.

The progress report of the tooth form committee, of which H. J. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., is chairman, showed that considerable work had been done.

W. H. Phillips, R. D. Nuttall Co., Pittsburgh, chairman of the electric railway and mine gear and pinion committee, reported that the committee had worked up, in conjunction with the American Electric Railway Association, a satisfactory standardization of web holes in forged gear blanks. It is felt that the establishing of web hole standards for forged blanks will simplify railway gear design. This committee is working with the metallurgical committee on materials and heat treatments.

T. C. Roantree, Westinghouse Electric & Mfg. Co., East Pittsburgh, made a progress report for the non-metallic gearing committee. The test methods worked out by this committee together with test specimens will be presented to the American Society for Testing Materials. The tensile split test, which has been found difficult to make, will be discontinued. A stress of 6000 lb. per sq. in. in computing tooth strength, using the standard Lewis formula for cast iron and substituting 6000 lb. for 8000 lb. has been adopted by the committee. In nomenclature it has been decided to follow the lead of the A. S. T. M.

The inspection committee, of which F. G. Eppley, Albaugh-Dover Mfg. Co., Chicago, is chairman, plans to submit at the next meeting recommended practice relating to the inspection of shaper and rotary cutters. The committee has been requested to provide a method for indicating the helical angle on herringbone and helical gears. L. G. Nilson, chairman of the keyway

committee, presented a progress report. This committee plans to submit recommendations at the next meeting.

Transmission Committee Submits Progress Report

The first report of the transmission committee was submitted by its chairman, A. P. Emmert, Warner Gear Co., Muncie Ind. A survey to ascertain in what way the committee could serve the association, with particular reference to bringing about standards or working tolerances, was said to reveal that the problems of the automobile transmission builders are universal. From correspondence with members and engineers of automobile plants it was thought that data on the relative merits of ground and unground gears, carbonized and oil treated gears, stub tooth and straight pitch gears, and the best method of checking gears and cutters, were among the items requiring attention. It was suggested that papers on these subjects would be of wide interest. The committee recommended for consideration the S.A.E. standard for sizes of fly wheel housings to receive unit power plant transmission. A sketch showing size of flanges with dimensions and tolerances, which was agreed upon at a joint meeting of the transmission and motor departments of the S.A.E., was submitted to the gear associations membership.

The differential committee submitted a new series of drawings covering the detail parts of a general design of a two-piece four-pinion differential in two sizes. The two sizes of differentials cover the 18 to 10 ratio of inside gears and the 20 to 11 ratio of inside gears, both of them being 5/7 pitch, 20 deg. pressure angle. Figures that relate to the cutting of the teeth have been omitted. It is planned to establish in a separate table a series of spline sizes which will be suitable for differential side gear purposes. Each drawing has the notation: "This is a recommended practice only." The report, which was presented by the Chairman, S. O. White, Warner Gear Co., Muncie, Ind., was accepted as a progress report.

New Member Companies Elected

Three new member companies were elected. They were the Cleveland Worm & Gear Co., Cleveland, with H. C. Dingle executive representative; Dodge Mfg. Co., Mishawaka, Ind., with D. J. Campbell representative; and the Farrel Foundry & Machine Co., Buffalo, W. E. Sykes executive representative. New associate members of the W. A. Jones Foundry & Machine Co., Chicago, are W. F. Coleman and L. C. Meyer.

The ninth annual meeting is to be held in Pittsburgh, May 7 or 14, 1925, the exact date to be announced later.

Will Soon Begin Advertising

An early start will be made in the advertising and publicity campaign, promoted by the National Association of Sheet and Tin Plate Manufacturers. According to present schedules, the initial advertising will appear in November. By this campaign, designed to extend over a period of several years, sheet makers hope further to extend and diversify the uses of steel sheets, to impress further upon the public the meritorious qualities of the product and to regain some of the business in galvanized and corrugated sheeting material lost to manufacturers of prepared roofings, who have been intensively advertising their products with successful results.

Building material prices during the past 12 months have averaged within a range of 5 per cent, according to *American Contractor*. This is in sharp contrast to the first nine months of 1923, when the range was almost 20 per cent, while the range between the average of 1919 and the average of 1920 was more than 35 per cent. Construction labor does not show the same situation. Beginning in April, 1923, and continuing for 15 months, wage rates have been advancing steadily and now show a 15 per cent increase over the spring of 1923.

New Molding Machines Feature Exhibition

Equipment, New and Re-Designed, at Annual Foundrymen's
Show—Improved Cleaning Devices—

A Record Display

THE exhibition at the annual convention of the American Foundrymen's Association in Milwaukee, Oct. 11 to 16, was fully up to the standard set in previous years and by many was regarded as the best exhibit ever held. It occupied more floor space than ever before and the number of exhibitors was larger than at any previous convention except at Columbus in 1920. More power was used in demonstrating equipment than at any previous show. The exhibit was widely diversified and included practically all equipment and products of direct interest to the foundrymen.

The display of molding machines showed that this field has made important developments during the year. Many new and re-designed machines were exhibited, although with the exception of only one or two the new models showed no radical departure in design from old types.

The tendency in molding machine development in the past year, as demonstrated by the exhibits, is to provide machines of more rapid operation, having more automatic features, with working parts more completely inclosed and with construction more rigid and more along machine tool lines. Formerly efforts were made to save minutes in production on molding machines. Now manufacturers are attempting to reduce by seconds the time taken for operations. From an exhibitor's point of view the convention was generally successful in that manufacturers of many lines reported they made a good volume of sales or secured a satisfactory number of live prospects.

It is possible here to mention only the more prominent new developments and striking features among the exhibits.

Molding Machines

A new design of jolt squeezer stripping plate machine, which draws the pattern on the down stroke of the squeezer piston, was shown by the Osborn Mfg. Co., Cleveland. This machine has a new design of squeezer head which tilts back to the rear, leaving both sides of the flask clear. The drawing mechanism works in oil and is controlled by oil. The squeezer piston is unusually long, its length being approximately two and one half times its diameter. The lifting frame is of the open end construction so that flasks of different lengths can be used and the frame can be furnished in any required width. The jolt and return mechanism to the draw is foot-operated, the only part hand-operated being the squeezer, which is controlled by a valve in the head. The Osborn company also showed a light small squeezer, the feature of which is the head. The operator pulls the head forward with one hand and by a slight downward pressure starts the squeezing operation. Another Osborn machine shown was a jolt stripping plate machine. This machine is an old type that has been re-designed, made simpler in construction and easier to repair. The machine is made in various sizes. New features were also shown on the Osborn company's standard roll-over jolt machine. This machine is now operated entirely by air and the leveling mechanism has been made automatic. Some other manually operated parts of the machine have also been eliminated. Another Osborn exhibit was a jolt roll-over squeezer pattern drawing machine of larger size than heretofore made and with some improved features.

A new high-speed molding machine made by the Stoney Foundry Engineering Equipment Co., Cleveland, attracted considerable interest. This is a vibrator

stripping plate machine, the ramming being done by a 5-in. one-way vibrator. A valve is provided for setting the time required for ramming the mold ranging from zero up to 6 sec. The back is rammed by the weight of the plate that swings on the head of the machine and is dropped down on the mold. It is claimed that with this machine a mold weighing 115 lb. for a 4-barrel cylinder casting can be made in 2 min.

A new line of molding machines was shown by the Tabor Mfg. Co., Philadelphia. New features of these machines are that they have shockless jar and strip by power. Hydraulic cylinders with high-speed valves are provided for drawing and rolling the patterns. It is stated that these new models are speedier than types formerly made by this company, the air consumption is less, they are more compact and will handle a greater range of work. The new features include an automatic roll-over locking device. The exhibit included a plain jar roll-over and pattern-drawing machine and a shockless pattern-draw and roll-over machine, the former of 600 lb. and the latter of 1000 lb. capacity, both with 12-in. draw, and a plain shockless jar and a jar machine, both with 8-in. cylinders and a capacity up to 2000 lb.

The Herman Pneumatic Machine Co., Pittsburgh, showed a working model of a new type of large jar ram roll-over pattern drawing machine.

The Arcade Mfg. Co., Freeport, Ill., showed a re-designed machine that was formerly manufactured by the Rockford Malleable Iron Works.

A large exhibit of molding machines and other foundry equipment was made by the American Foundry Equipment Co., New York. This company showed an electrically operated jolt roll-over squeezer and pattern drawing machine on which the pattern and drag are made simultaneously. It is claimed that this machine is particularly adapted for deep draw work. Among other exhibits of this company was a new type of all aluminum snap flask. This flask has no hinges and is made with a 5 deg. taper so that the mold can be stripped very easily.

A car wheel molding machine exhibited by the William H. Nicholls Co., Inc., New York, has an important new feature in that it is provided with an automatic discharge. After the mold is jolted and squeezed and while the pattern is being withdrawn, the mold is automatically raised and discharged on a roller conveyor and can be delivered to a stationary conveyor in the rear. Formerly the mold was lifted by a crane. This company also exhibited a new jolt squeezer machine, a roll-over squeezer and pattern drawing machine which automatically discharges onto a rolling conveyor and also a machine similar to the car wheel machine except that it is designed for lighter work and the raising and lowering are done by hand.

A machine developed for its own work in its plant was exhibited by the Wood Brothers Thresher Co., Des Moines, Iowa. This is an air squeeze roll-over machine that accommodates match plates for two different patterns of moderate size. The machine draws the cope and drag of either pattern in one operation.

A new jolt squeeze stripping machine with 10-in. cylinder and 4-in. draw was shown by the International Molding Machine Co., Chicago. This company also exhibited a new jar ramming turn-over pattern drawing machine for shallow work and a jolt ramming power stripping machine.

A new type of jolt squeezing machine was shown by the Adams Co., Dubuque, Iowa. The machine is capable of 300 jolts a minute and the jolting device is controlled by knee pressure. The squeezer piston is 12 in. in diameter by 12½ in. long and the jolt piston 5 in. in diameter by 8 in. long. The machine is made both in stationary and portable type.

A small stack molding machine of a new type was shown by the Grimes Molding Machine Co., Detroit, Mich., this being quite similar to the larger machine that has been made by this company, but designed for small shallow work. A feature of this new model is that the machine is arranged to measure the amount of sand that is to be rammed in each flask.

Two new machines were shown by the Milwaukee Foundry Equipment Co., Milwaukee, Wis. One was a jolt stripping machine designed for rapid and easy operation and the other was a jolt squeezing stripping plate machine. These machines have an arm support designed to insure a rigid platen and an even squeeze. This type of pressure head is said to reduce air consumption to a minimum.

A new portable jolt squeezer machine was shown by the Johnston & Jennings Co., Cleveland, which also exhibited a redesigned jolt squeeze machine adapted for multiple molding.

A combination jolt squeeze and pattern drawing or stripping plate machine in a new design was exhibited by the Berkshire Mfg. Co., Cleveland, which also exhibited a portable jolt machine which has previously been made only in the stationary type.

Core Machines

Two multiple core machines were exhibited by the Skeppstedt-Erickson Co., Moline, Ill. These were not new machines, but this was the first time they had been shown at the foundry exhibit. One fills a 12 x 26 in. core plate in one operation and is adapted for high production work. The other machine fills the same size of core plate with several rows of cores.

An important new feature was shown in the Demmler air operated core blowing machine exhibited by William Demmler & Brothers, Kewanee, Ill. The one pocket in the feed hopper in the old type has been replaced by four pockets. It is stated that, with this change, stiffer sand can be blown without clogging the hopper.

Sand Mixing Equipment

The exhibit of sand mixing equipment included a new model of mixer made by the Blystone Mfg. Co., Cambridge Springs, Pa. This is a large mixer with a capacity of 30 cu. ft. adapted for use in larger foundries for mixing facing sand. New features include a sliding discharge at the side and bottom and a Lemley clutch and pulley.

The exhibit of the American Foundry Equipment Co. included a new sand cutter operated by a gas engine and having roller and ball bearings and Alemite lubrication. It is built in different sizes of 6 ft. and less between the rear axles.

A new type of aerator for attaching to the discharge chute of a sand mixer was shown by the National Engineering Co., Chicago, which also exhibited a new portable sand mixing machine similar to some of its former models, but smaller in size. After reaching the aerator from the mixer, the sand is thrown by means of a revolving drum through the stiff bristles of a stationary brush, resulting in a fluffy sand.

Electric Charging Machines for Cupolas

For the first time electric charging machines for cupolas were shown. The Chisholm-Moore Mfg. Co., Cleveland, displayed a 3-ton electric charging machine of the Morgan type. The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., displayed an electric cupola charging machine equipped with two types of charging buckets, one the umbrella type and the other the bottom dump type, and the P. H. & F. M. Roots Co., Connersville, Ind., displayed a cupola charging machine.

Cleaning Equipment

The display of sand blast equipment of various types was extensive, although most of it had been shown previously. Interest was shown in an exhibit of a battery of two tumbling mills by the W. W. Sly Mfg. Co., Cleveland, the feature of which was the combination clutch and brake operated by one lever for stopping and starting each mill independent of the other and for holding it in any desired posi-

tion. For loading and unloading from either side the mills are provided with only a short shaft. This company's exhibit included a new direct motor driven sand blast mill of the tilted type, practically the entire front of which opens for loading and unloading. Another new product was a turntable sand blast cabinet of the type where the operator stands on the outside. The special feature of this was that the turntable and sand hopper revolve as a unit. This company also showed a complete sand blast room, outstanding features of which were an improved application of down draft ventilation, one valve control of sand blast tank from the inside of the room and well arranged lighting fixtures to provide an abundance of illumination.

New features in design were shown in a swing frame radial grinder exhibited by the Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn. The grinding wheel is located on the outboard end of the spindle so that, in changing wheels, it is only necessary to remove the guard. The spindle swings on ball bearings. The machine has neither belts, countershafts, or overhead suspension. The same company exhibited a chain driven, motor driven buffing lathe. The drive from the motor is through a chain and sprocket by which the required speed reduction is provided. The chain runs in an oil tight case.

In the core oven exhibit was included various types of ovens shown by leading manufacturers. One new type of oven was exhibited, this being a continuous vertical conveyor oven shown by Young Brothers Co., Detroit. The cores are carried to the top of the oven and down the opposite side, where they are discharged.

The oven is loaded and unloaded automatically by means of gravity conveyors. Various advantages are claimed for this new type of oven, among them the saving of floor space and the conservation of fuel.

A new type of wet disk grinder was shown by Charles H. Besly & Co., Chicago. This is a 42-in. machine and can be used for either wet or dry work. This firm also showed a new 20-in. double disk grinder with outboard supports and ball bearing spindles.

Welding and Cutting Apparatus

Various types of electric welding apparatus and gas welding and cutting equipment were shown. The Oxweld Acetylene Co., New York, displayed a new five cylinder portable oxygen manifold designed especially for field use, but which also may be used as a stationary installation. A new regulator to go with this manifold was also shown. The Burdett Mfg. Co., Chicago, exhibited a new automatic equal pressure two gas regulator.

Machine and Other Tools

While the exhibit of machine tools was not large, it included all the various types of machines used in foundries and a number of new models that were exhibited at the Steel Treating Convention in Boston. The largest machine tool exhibit consisted of 20 or more machines in operation shown in the booth of E. L. Essley Machinery Co., Chicago. This included lathes, drilling and milling machines, grinders, metal sawing machines and other tools. There was also a good exhibit of wood-working and pattern making machinery.

The pneumatic tool exhibit of drills, grinders, chipping hammers, sand grinders and other tools was quite extensive and interesting, several exhibitors showing their complete lines. The Independent Pneumatic Tool Co., Chicago, among other exhibits, showed an electric screw driver which was believed to be of interest to foundrymen because it can be used for driving stove bolts. An interesting feature of this company's exhibit was a new moisture separator designed for increasing the efficiency of pneumatic tools by removing the moisture from the air.

Material Handling Equipment

The importance of material handling equipment in foundries was well illustrated by the very extensive and interesting exhibit of various types of handling equip-

(Concluded on page 1103)

Aluminum and Non-Ferrous Alloys

Institute of Metals Discusses 14 Papers and Reports
at Foundrymen's Convention in
Milwaukee

FOR several years the Institute of Metals section of the American Institute of Mining and Metallurgical Engineers has held simultaneous sessions with the American Foundrymen's Association at its annual meetings. This year representatives of the institute in fairly large numbers conducted three sessions on the first two days of the convention of the American Foundrymen's Association at Milwaukee, Oct. 13 to 16. The program consisted of 13 papers and one committee report. The first session was devoted to brass foundry matters, the second session to aluminum alloys, and the third to non-ferrous metals, the first two sessions being joint meetings with the foundrymen. General satisfaction was voiced with the quality of the papers and the success of the meetings. Some of the leading features of the various sessions are given in the following pages.

About 40 representatives of the institute met at a dinner at the Hotel Pfister, Monday evening, Oct. 13, at which George K. Elliott, chairman of the institute, presided. A feature of the informal addresses after the dinner was a recital by W. M. Corse, chairman, division of research extension, National Research Council, Washington, covering some of his experiences in England where he delivered the annual fall lecture at the Institute of Metals in London in September. An important subject also discussed was the problem of securing adequate abstracts of non-ferrous literature in a form available for all members of the institute.

Aluminum Alloys

Discussions among the non-ferrous alloy makers, meeting jointly with the Institute of Metals, were confined almost entirely to the aluminum alloys which have been developed in recent years. Therefore much was said about duralumin, and little about brass, despite the fact that there is perhaps a ton of brass used for every pound of duralumin. But brass is a commonplace; duralumin is novel.

Castings from Remelted Scrap

H. C. Knerr described the methods used at the Naval Aircraft Factory, Philadelphia, to manufacture castings of No. 12 alloy (Copper 8 per cent, aluminum 90 per cent). The factory produces these in a small way, on account of the difficulty experienced in securing small quantities of parts which must be free from porosity and inclusions. A welded steel pot, 12 in. in diameter and 30 in. deep is set in an oil-fired tilting gas furnace. Preliminary heats, remelting scrap crank cases of approximately correct chemical composition, and others made up with pig metal, were unsatisfactory. Success was achieved using 99 per cent aluminum, sheet clippings and light scrap copper.

Melting and pouring temperatures are carefully controlled by pyrometer. During melting the temperature will remain between 1200 to 1250 deg. Fahr., and, when fully melting, rises to 1350, when the copper is added. After stirring with an iron rod, the metal rests a few minutes and is skimmed. About one ounce of zinc chloride per 100 lb. metal is then stirred in with a special spoon, again skimmed, and immediately poured (Temperature 1325 to 1375 deg. Fahr.) in preheated steel hand-ladles.

Three round test bars are cast from each heat. Furthermore, each casting which carries liquid is tested for tightness under 10 lb. air. Small pin-hole leaks are closed by impregnating with sodium silicate. Rejections for all causes amount to 7 per cent.

Discussion

Dr. Earl Blough, Technical Director of the Aluminum Co. of America, in discussing this paper, called attention to the advantage of retaining some molten metal in the furnace to start the new heat. It would then be possible to submerge cold additions immediately, with obvious reduction in dressing, and a consequent improvement in the physical properties of the resulting castings. He also was inclined to believe that Mr. Knerr's melting pot, which showed no signs of corrosion after months of use, was very exceptional. Hot aluminum absorbs considerable iron from containers, either steel or cast iron. Such pots,

lined with a thin refractory, are to be preferred. A test on this detail resulted as follows:

Portions of the same ingot were held in similar cast iron pots side by side in the same furnace. One was lined, and the other bare. Analyses of iron contained in the molten metal at hourly intervals resulted:

	Lined Pot	Unlined Pot
At start:	0.75 per cent Fe	0.72 per cent Fe
	0.73	0.81
	0.70	0.87
	0.70	0.96
	0.80	1.06
	0.73	1.16
	0.73	1.39
	0.73	1.62
...	...	1.73

Reclamation of Defective Castings

Supplementing several contributions on the subject of defective aluminum castings, resulting from a long study of the subject by the Bureau of Mines, R. J. Anderson and M. E. Boyd presented a paper on "Salvage and Reclamation of Aluminum-Alloy Castings."

There are three methods of salvage used in foundries, namely: burning-in, soldering, and oxy-acetylene welding. The first is used to a considerable extent abroad and is frequently met here. It merely consists in setting the defective part in a mold and pouring liquid metal to fill up the joint. Heat from the added metal is relied upon to raise the solid edges to the alloying point. This effect is secured, however, very imperfectly.

The authors emphasize in many places the fact that soldering should be done "for looks" only. That is to say, a defective should be soldered only if it would serve its purpose equally well without patching. Strength of a soldered joint is limited by the difficulty in getting a good "tinned" surface and the inherent weakness of the alloys used for solders.

A very important economic advantage, however, results from the intelligent use of the oxy-acetylene process. A table is presented showing the practice at representative foundries:

Production	Total Castings Poured	Passed First Inspection	Castings Saved by Welding	Wasters
Miscellaneous automotive.....	2695	1018	808	267
Motor crank cases.....	502	270	214	18
Differential housings.....	435	242	98	160
Jobbing foundry.....	100	92	5	3
Motor castings.....	100	84	12	4

It is estimated that the average casting loss for the entire industry is 15 per cent of the total production (100,000,000 lb. annually) of which at least half can be reclaimed by welding. Figuring the cost of scrapping castings at 15c. per lb., the saving due to reclaiming by oxwelding is of the order of \$1,125,000 per annum. It is obvious that any department of a foundry which is responsible for such savings is

worthy of the careful attention of the management, and the close supervision of a competent foreman.

Discussing the metallurgical aspects of salvage the authors note that the weld metal will nearly always be of finer grain-size than the bulk of the casting, although the added metal will usually contain more small blow-holes. They say it is easy, however, to get a weld which has 80 per cent of the strength of the aluminum casting, which is ample, considering the large factor of safety usually allowed in the design of castings. A high strength joint is due to the actual alloy between the metal and the weld, the weld itself having as nearly as possible the chemical composition of the metal, and protection from atmospheric oxidation being afforded the hot metal by a properly balanced flame.

Discussion

Jesse L. Jones, of the Westinghouse company, agreed with the authors' appraisal of the salvage situation, but wished to stress the necessity of proper preparation and preheating before welding commenced. This will avoid cracking the casting in another place by expansion stresses—the great fault of "burning-in." If soldering is done for appearance only, he finds that the so-called "Richards" aluminum solder will work very easily. It contains aluminum, tin and zinc, with enough phosphorus to be self-fluxing.

During a recent trip abroad, he found a very remarkable repairing process in use—chiefly for building up purposes or for adding a heavy coating of another metal. It is done by a modification of the Schoop metal spray process. By proper adjustment of the flame, a coherent mass, equivalent to cast metal, can be applied to another metallic surface. It is not confined to the low-melting white metals, for bronze, machineable copper, and nichrome alloys have been successfully worked in this manner.

Aluminum-Silicon Alloys

Two papers descriptive of the "modified" aluminum-silicon alloys were read, one entitled "Foundry Treatment and Physical Properties of Silicon-Aluminum Sand Castings" by D. Basch of the General Electric Co., and H. F. Sayre, of Union College, and the other, "A New Aluminum Alloy-Alpax" by Leon Guillet of Paris.

It is fairly well known that shrinkage of alloys high in silicon is lower than other commercial alloys of aluminum, owing to the fact that silicon, like water, expands on freezing. Dr. Aladar Pacz—who was present at the meeting—started work on these alloys in 1917, and found that the strength of such castings is greatly increased if the melting and alloying is done at an unusually high temperature under a flux consisting of alkaline chlorides and fluorides. Associated with this improvement in properties the micro-structure of the alloys is profoundly changed. When melted without flux the structure is that of a eutectiferous series, the primary crystals arranged in large dendrites, whose branches are rounded by surface tension. After melting with the flux the two major constituents—aluminum and silicon—are much more finely dispersed, one in another. In fact, the eutectic point appears to be displaced from its normal composition of 10 per cent silicon, to about 14 per cent silicon.

Independent investigators found at a later date that the same effect could be had if the alloy were melted without flux and a minute quantity of alkaline metal stirred in. Most of the discussion at the meeting was between the proponents of the two methods of procedure although, as was pointed out, either process undoubtedly will do the work.

Discussion

R. E. Archer of the Aluminum Co. of America said that he preferred modification by alkaline metal because it could be done at a lower temperature and in large quantities (900 lb. at a time). Furthermore, a smaller amount of aluminum was lost in the reaction. He questioned the specification recommended by Dr. Basch, saying that while it was easy to get a strength of 25,000 lb. per sq. in., it was much more difficult to produce elongations greater than 8 per cent.

He also called attention to the fact that excellent though the modified alloys are, other aluminum alloys have certain points of superiority. Thus, even with the best melting and casting practice, aluminum-silicon alloys are harder to machine than No. 12 alloy (aluminum 92 per cent, copper 8 per cent). The former drags under the tool, leaving a roughened surface, and is also hard on the cutting edge. As a matter of fact unmodified alloys having up to 10 per cent silicon have good foundry properties and develop a tensile strength of 20,000 lb. per sq. in. with 3 per cent elongation. In his experience, he is finding the 5 per cent silicon alloys replacing 5 per cent copper alloys.

Many of these points, however, are still subject to discussion, since the new alloys have not been employed long enough or in enough different ways to establish without question their excellencies and their limitations. Particularly was it true, as Dr. Basch pointed out in the discussion, that the theory underlying the modification process and the remarkable change in micro-structure has not yet been worked out satisfactorily. Furthermore, any statement regarding machineability of the alloys was to be accepted with caution, since this feature depended so much on the tool contour, the foundry practice, the presence of hard spots and so on.

Duralumin Castings

"Casting and Heat Treatment of Some Aluminum-Copper-Magnesium Alloys" was discussed by Samuel Daniels, A. J. Lyon, and J. B. Johnson of the Army Air Service. Two types were studied, one containing 4 per cent copper, and the other containing from 2 to 3 per cent copper. The best combination of physical properties in these alloys, as sand cast, resulted from the following analysis: Copper, 2.5 per cent; magnesium, 0.5 per cent; iron, 1.25 per cent; silicon, 0.25 per cent. It had a strength of 25,000 lb. per sq. in. and an elongation of 4.0 per cent. Increase in copper to 3.0 per cent reduced the elongation to 3 per cent, and further increase in copper to 4.0 per cent dropped the elongation to 1.5 per cent.

Such compositions must be made of a high-grade aluminum ingot, and most of the iron introduced by a hardener alloy. They, however, are only slightly more difficult to cast than No. 12 alloy. Complicated castings are made with relatively heavy risers, placing chills in the molds at abrupt changes in section. Even in such castings, impervious articles may be made. Pouring temperature should be regulated by pyrometer at 1250 to 1300 deg. Fahr. Molds made of Albany sand are most desirable for general use.

Cast duralumin with 2.5 per cent copper can attain a strength of 29,000 lb. per sq. in., elongation of 3.5 per cent, and Brinell hardeners of 67 after a short heat treatment involving heating at 950 deg. Fahr. for 2 hr., quenching in boiling water, and aging for 2 hr. in boiling water.

Maximum physical improvement of the high-copper castings depends upon a much longer heating—approaching the malleableizing treatment for white cast iron. For instance, an alloy containing 4.6 per cent copper, 0.10 magnesium, 0.45 silicon and 0.55 iron developed 17,800 lb. strength and 4.2 per cent elongation as cast. After annealing for 96 hr. at 950 deg. Fahr. and quenched in cold water, then aged at 300 deg. Fahr. for 8 hr., a strength of 44,100 lb. per sq. in. was attained, the ductility decreasing to 1 per cent and the Brinell hardness rising to 96.

Discussion

As pointed out in the discussion by Dr. D. Hanson of the British National Physical Laboratory, the temperature of quench should be above the line of solid solubility of the compounds Mg_2Si and $CuAl_2$, and the time long enough to attain equilibrium by putting the maximum amount of these compounds into solution. That being determined, the subsequent aging process should be studied in an effort to develop the combination of physical properties desired in the casting under order. What can be done in this regard is seen from one heat which developed an ultimate strength of 37,000 lb. per sq. in. and an elongation of 12 per cent, with the optimum heat treatment.

Foreign Competition an Important Factor

Position of Steel Corporation as to Freight Rates Discussed at Hearing Before Interstate Commerce Commission on Proposed Reductions

BY L. W. MOFFETT

WASHINGTON, Oct. 21.—Freight rates having increased in importance by reason of the methods of quoting steel prices since the abolishing of the so-called Pittsburgh plus practice, exceptional interest was shown in arguments made last Wednesday and Thursday before the Interstate Commerce Commission concerning proposed reductions in all-rail rates on commodities originating from territories west of the Indiana State line to Pacific Coast terminals. The proposal takes into account 41 commodities, among which are iron and steel. This application would reduce the rate on leading iron and steel articles, such as bars, plates, shapes, sheets, pipe and pipe fittings and wire, from \$1 to 80c. per 100 lb. from group D points of origin to Pacific Coast terminals. Roughly, group D points begin with a line parallel with the Mississippi River and extend to the Missouri River line. The belief exists on the part of some sources that competition between Pittsburgh district and Chicago district mills will become even keener than previously, and, therefore, will involve an effort on the part of manufacturers in both districts to develop further the Pacific Coast market, giving added interest to this proceeding.

Arguments were made, however, that one purpose of the reduced rates was to meet competition in Pacific markets with foreign mills. Robert Hula presented the arguments for the independent iron and steel manufacturers in the so-called group D territory. Specifically, he was authorized to file appearance for the following interests: Acme Steel Goods Co., A. M. Castle & Co., Crane Co., Chicago Bridge & Iron Co., Interstate Iron and Steel Co., J. T. Ryerson & Co., Inc., and Wolff Mfg. Co., Chicago; Keystone Steel & Wire Co., Peoria, Ill.; and the Walworth Mfg. Co., Kewanee, Ill.

Water Competition Rate

As pointed out by Mr. Hula, the reduced rate proposed on iron and steel products is predicted primarily upon the water competition rate from Pittsburgh through Baltimore, thence by vessel through the Panama Canal to the Pacific Coast terminals. He declared that the prime interest of the independent iron and steel manufacturers of the Illinois-Indiana district, so far as this particular case is concerned, is to secure a fair relationship of rates as well as to obtain equality of opportunity in Pacific Coast markets with competitors in that area where water service and rates set the basis of commercial transactions.

"A denial of fourth section relief in this proceeding as recommended by the attorney examiner will virtually exclude the independent iron and steel manufacturers of Chicago and the Middle West from Pacific Coast markets and will thereby give the Eastern mills a practical monopoly of that trade," said Mr. Hula. "It will likewise destroy competition in the steel industry which the Sherman act and the Interstate Commerce act are designed to foster and preserve. Competition between the rail carriers and steamship lines operating in Pacific Coast trade will likewise be eliminated and allow the latter to operate without restrictions or regulation while the rail carriers are firmly bound by the Interstate Commerce act. The intercoastal steamship lines can be used effectively to restrain trade without fear of violating the Sherman act, all of which would prove detrimental to industry located in the Middle West."

Referring to a reply brief by the United States Steel Corporation subsidiaries, Mr. Hula said it is stated that the Middle Western shippers through the

Chicago Association of Commerce, as well as the transcontinental rail carriers, have misconstrued and misstated the testimony of the corporation's witnesses to be in opposition to the rail carriers' application. Denial was made by Mr. Hula that the interests he represents had made any misstatements regarding the purpose of Steel Corporation witnesses and in this connection Mr. Hula called particular attention to a statement which, he said, was made by C. S. Belsterling, the Steel Corporation's counsel at the New York hearing, whom Mr. Hula quoted as follows:

Opposed to Reduction

"We as a unit are unalterably opposed to making any reduction in the present rate as unwise, unsound, uneconomical and propose later to put in testimony along these lines."

It was declared by Mr. Hula that he was unable to understand the position of the Steel Corporation when the latter denies "in one breath that the purpose of its testimony was in opposition to these carriers and in the next breath counsel himself states specifically that the sole interest of the corporation in this matter is to prevent the action being taken by the transcontinental railroads in this proceeding."

Continuing, Mr. Hula said: "The Steel Corporation counsel points out in his reply brief that if an 80c. rate on iron and steel such as is proposed in this proceeding is held to be a reasonable compensatory rate from the Indiana-Illinois district to Pacific Coast markets, it necessarily results in creating undue prejudice to the so-called Middle district of Ohio and Pennsylvania, when compared with the latter's rates to Atlantic ports for transshipment; and that for the same reason the 80c. rate would be preferential to the Middle West."

"Just what reasoning was applied to arrive at such a conclusion is difficult to ascertain, but presumably an 80c. rate on the list of iron and steel articles involved in this proceeding when used by the independent manufacturers is supposed to give the latter an advantage over the corporation which enjoys the equivalent rate from Middle district mills via the Atlantic seaboard in connection with its own boats in intercoastal service. This is emphatically denied and the commission should know that the 80c. rate proposed via all-rail routes is no lower than the rates enjoyed by the Eastern mills through Atlantic ports. It is indeed a matter of surprise to have Mr. Belsterling make such a statement in view of the fact that the Steel Corporation now enjoys a rate of 75c. on tin plate in carloads from Chicago to the Pacific Coast, especially when this rate was established upon the urgent solicitation of his own interests. We feel that it is unnecessary to attempt any argument in justification of the 80c. rate under such circumstances and desire merely to state that the examiner found that the proposed terminal rates are no lower than would be necessary to permit the applicants to compete on a relatively equal basis with the water lines."

Free Use of Panama Canal

Mr. Hula again referring to Mr. Belsterling's statement that the sole purpose of Steel Corporation subsidiaries is to prevent any action by transcontinental railroads that would embarrass the steel manufacturers in their free use of the Panama Canal to meet foreign competition, declared that foreign competition is one of the important factors in the determination of

the issue. Mr. Hula insisted that independent steel manufacturers throughout the Middle West also desired to meet foreign competition at rates which are no lower than those enjoyed by the Middle district mills in Ohio and Pennsylvania. It was asserted by Mr. Hula that granting of the relief asked would in no wise hamper the opportunity of Eastern mills to meet foreign competition "but may result in a striving for business between the Middle district mills and the Indiana-Illinois mills so far as Pacific Coast terminals are concerned."

Mr. Hula said that the independent manufacturers whom he represents must be given a rate such as the carriers are proposing, before the manufacturers can begin to compete with the mills located in the so-called Middle West district of Ohio and Pennsylvania. It was asserted by Mr. Hula that the statement carried in the reply brief of the Steel Corporation subsidiaries, that there is not a sufficient diversity of steel articles produced in the Chicago district to take care of the markets west of that district "is of no particular significance, as there is ample production of the articles manufactured in Chicago and the Middle West to take care of the general markets of the West."

Large Interests at Stake

Mr. Hula, saying that the Sherman act and Interstate Commerce act contemplate the preservation of competition between industry as well as between carriers, continued: "We of the Middle West have large interests at stake which compel our seeking every opportunity to retain markets for the products of our industries. We not only must meet domestic competition but foreign competition as well and if our markets are circumscribed, large investments will be impaired and activity curtailed, placing a blight upon the normal growth of our communities."

"Your commission is urged to give due consideration to the effects of water competition upon existing manufacturing and marketing centers which have come into existence through natural and economic causes and as a result of railroad development together with the past policies of our Government."

"We strenuously disagree with our Eastern competitors that the Pacific Coast markets belong to them and therefore come to your honorable body with a

prayer that relief be granted in accordance with the facts of record notwithstanding the conclusion and recommendation made by the examiner."

In replying to statements by Mr. Hula, it was emphasized by Mr. Belsterling that the sole interests of Steel Corporation subsidiaries is to prevent any action being taken by long line or transcontinental railroads that would embarrass the steel manufacturers of the United States in their free use of the Panama Canal which is necessary to enable them to meet successfully foreign competition along the Pacific Coast.

Mr. Belsterling pointed out in his brief that misconstruction had been placed upon testimony by Mr. Coakley, who had testified in opposition to the rail carriers' position, it having been claimed that the attitude of Mr. Coakley was due to the fact that the interests which he represents operate a number of plants at or adjacent to the Atlantic seaboard, together with a fleet of vessels.

Where Steel Is Made

Mr. Belsterling pointed out the principal steel producing districts in the original territories affected. It was declared that the Middle West, which embraces Johnstown, Pittsburgh, and related districts, extending as far west as Lorain, Ohio, has a productive capacity of two-thirds of the combined ingot capacity of the United States; that the Indiana-Illinois district produces some 20 per cent; that the Michigan-Wisconsin district produces 1.5 per cent, and the Alabama district something over 3 per cent. Mr. Coakley, according to Mr. Belsterling, said there was insufficient productive capacity in the Indiana-Illinois district to take care of the vast markets lying west of the Indiana State line and including the Pacific Coast. As a typical example, it was stated that the American Steel & Wire Co. has 29 plants located throughout the country, four in the Northeastern territory, nine in the Pittsburgh district, 11 in the Cleveland district, and five in the Birmingham district and other places. It was insisted that there is not a sufficient diversity of steel articles produced in the Chicago district to take care of markets west. The American Steel & Wire Co., it was asserted, relies upon Eastern mills to provide for export demand and Pacific Coast demand.

Increased Production of United Alloy Steel Corporation

One of the recent improvements in the equipment of the United Alloy Steel Corporation, Canton, Ohio, was the combining of its Lamberton and 20-in. mills into one unit. Prior to the change, the greatest combined record of monthly production of both mills was approximately 12,000 tons per month. The new arrangement produced at the rate of 20,000 tons per month—exceeding the previous capacity of the same equipment by 8000 tons per month.

The change consists of the addition of four two-high stands of 20-in. rolls so arranged as to relieve the Lamberton mill of four passes, using it as a rougher. Three stands of two-high rolls are set at proper intervals in line with the Lamberton mill delivery table, so spaced that the bar is clear of one stand before entering the next. After passing the third stand, it is transferred broadside to the finishing stand and is then delivered to the old hot bed, which was narrowed enough to install the old Lamberton mill runout table as the delivery table from the new finishing stand without changing the location of the bed. The hot saw was removed to the table delivering steel to the shears and either sawed or sheared product is obtained.

In order to heat the steel properly and in sufficient quantity, a new heating furnace having a hearth 13 x 60 ft. was installed, in addition to the old 13 x 34 ft. furnace; both furnaces, heating 8 x 8 in. blooms 11 ft. long, have a combined capacity of 50 tons per hr. Ranges of sizes on this mill since improvements were completed are as follows: On rounds and squares, 2 in. to 6 in.; on flats, 4 x ½ in. to 10 x ¾ in. and thicker.

With this high heating and rolling capacity the new layout makes an arrangement calculated to produce a large tonnage of rounds, squares and flats, either in alloy or common steels. The new furnace was designed primarily with the idea of having the alloy steel brought up gradually to the required rolling temperature.

Consolidation of Furnace Equipment Makers

The Combustion Utilities Corporation has announced a consolidation of the personnel and activities of its appliance and industrial furnace departments with those of the Surface Combustion Co., furnace engineer and manufacturer, the greater organization to be known as the Surface Combustion Co., Inc., the utilization division of the Utilities corporation. Acquisition of the Surface company by the parent company was announced last March.

Under the consolidation Henry O. Loebell continues as president of the Surface Combustion Co., Inc.; E. E. Basquin will be vice-president and general manager; W. M. Hepburn, vice-president; Frank H. Adams, treasurer, and E. M. Doig, secretary. Paul J. Nutting, formerly in charge of the Toledo, Ohio, division of the Combustion Utilities Corporation, becomes vice-president in charge of production, and C. B. Phillips, formerly sales manager in that division, becomes vice-president and sales manager of the stock furnace division. General offices of the Surface Combustion Co. will continue at 366-68 Gerard Avenue, New York, and all production at the Toledo works, 2288 Albion Street.

Buying Coal on a Guaranteed Basis

Results of Efforts of Southern Ohio Pig Iron and Coke Association to Improve Fuel Reported at Joint Meeting with American Institute of Mining and Metallurgical Engineers

THE sixth annual meeting of the Southern Ohio Pig Iron and Coke Association was held at Columbus, Oct. 17 and 18, as a joint meeting with the Ohio Section of the American Institute of Mining and Metallurgical Engineers. The principal subject to come before the meeting was the report of the committee appointed at the January meeting for the evaluation of coal. The meeting was presided over by R. H. Sweetser, president, and about 60 members and guests were present.

W. W. Stevenson, Semet-Solvay Co., Detroit, chairman of the coal evaluation committee, gave a review of the work done by the committee since its organization, in which he stated that the evaluation of coal was such a large subject that the committee felt that for the present at least it would be well for it to consider only the evaluation of coal for blast furnace use. The committee took the analysis of coke agreed upon by the Southern Ohio Pig Iron and Coke Association as a basis for discussion, and a recommendation was made that the base coal to be used for by-product coking purposes should have approximately 6.5 per cent of ash on a dry basis, and a volatile matter content such that 1.45 tons of coal are required for one ton of coke. The tentative recommendation was also made that moisture should not be over 3 per cent, and sulphur no greater than 0.75 per cent, with a penalty for sulphur above 1 per cent. The recommendations of the committee were made after full discussion, aided by charts showing experiments conducted by L. R. Forest, Semet-Solvay Co., Syracuse, which showed the advance in the cost of producing pig iron from high ash coal. The charts showed that for every 1 per cent of ash there was an increase in the cost of producing one ton of pig iron of 33c. per ton in coke consumption alone, and other elements such as stone were also used in greater quantities, the total added cost being estimated, when producer's profit was added, at \$2.50 per ton of pig iron produced.

Discussion of the committee's report followed, and a recommendation made that the committee continue its deliberations, taking in also the evaluation of coal for gas producer and steam use, and endeavor to arrive at a base coal analysis similar to that used in the iron ore trade, and above which a premium would be paid for coal, with a penalty for coal below the base grade.

Clean Coal Campaign

President Sweetser, in his address, reported that the clean coal campaign inaugurated by the association two years ago was having wonderful success. He declared that since the matter had been brought to their attention, the coal operators were determined to set their house in order without interference from outside sources, and cited the change in advertising methods of many of the companies in which clean coal was stressed. Whereas two years ago it was almost impossible to get clean coal, today coal can be bought on a guaranteed basis. The campaign was an educational one, and it is getting down to the miners themselves, as in a recent agreement signed in an Ohio district, the miners agreed to take every means in their power to mine clean coal.

The question of sampling coal was taken up in a report by C. B. Murray, secretary of the Ohio Section of the American Institute of Mining and Metallurgical Engineers, in which he cited a number of methods of sampling, and recommended that the proper place for sampling was at the mines. The question of coal analysis was discussed by Prof. D. J. Demorest, Ohio State

University, in which he said that the only inspection necessary in cases where output of certain mines is purchased is for ash and sulphur. When buying from the jobber, all tests must be made, and in the case of coal for gas producer use a check of the B.t.u.'s was also necessary.

Sampling and Inspection

A discussion of the methods of sampling and inspection followed a report by G. W. Coughlin, American Rolling Mill Co., Ashland, Ky., in which he described the value of the visual inspection carried on by his company at its mines. The main reason for this inspection is to check up the mines. The company has set up a quality standard for each section of mines. A complete visual inspection checked by a 20 per cent analysis made a complete but not costly standard. Referring to the value of the inspection department, Mr. Coughlin said that for a six month period, the ash content of coal mined in the various sections where inspectors were employed had dropped approximately 50 per cent.

Laboratories at Mines

Discussion of the report revolved about the establishment of control laboratories at coal mines, from which a quick report could be secured as to the analysis of coal being mined. It was felt that if it were possible to have control laboratories established, it would be a very profitable investment for the producer. Prof. H. E. Nold, of the Mining Department of Ohio State University, gave a concrete instance of the value of a control laboratory, and stated that with such a laboratory, the producer would be in a position to know just what kind of contract to accept, thus eliminating the danger of having coal shipped rejected on reaching destination. The cost of such a laboratory would be extremely small as compared with the results obtained.

Further discussions on the question of rating of mines, grading of mines, grading of coal, education of miners, producers and consumers, and of waste took place before the meeting adjourned, but no action was taken on any definite recommendation, it being felt that the association should make only tentative recommendations until the question of evaluating coal could be more thoroughly discussed. The transactions of the association will be published for the use of the members of the association and for the guests at the meetings.

Coal Mining Machinery

Following the dinner meeting, motion pictures of coal mining machinery and loading conveyors were shown by the Jeffrey Mfg. Co., after which Prof. C. E. Sherman, professor of civil engineering, Ohio State University, with the aid of maps, showed the advantages to be gained by building a waterway connecting the Great Lakes with the Ohio River by using the route from Sandusky to Columbus, and thence to the Ohio River at Portsmouth by way of the Scioto River.

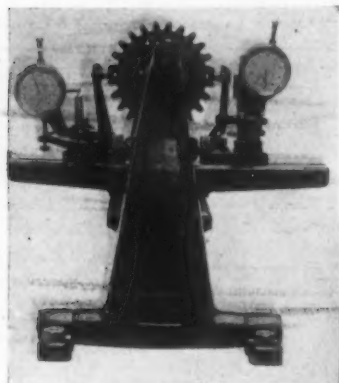
On Saturday the members of the two associations were the guests of the Jeffrey Mfg. Co. on a trip of inspection through its plants, followed by luncheon and attendance at the Ohio State-Oberlin football game. In the evening the members were the guests of Vice-President J. H. Frantz, American Rolling Mill Co., Columbus, at dinner at the Athletic Club.

The election of officers, usually held at the annual meeting, was postponed till next meeting, the present group holding over. Fourteen new members were elected.

Gear Testing Machine of Swiss Design

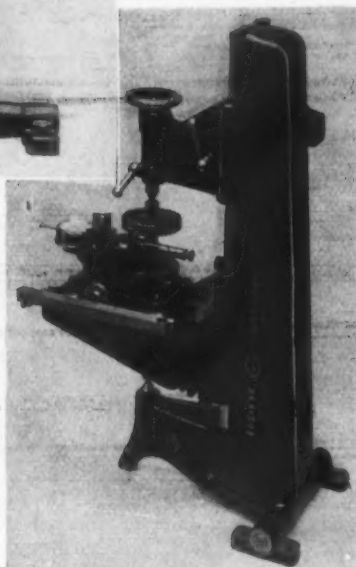
A gear testing machine recently developed by the Société Genevoise d'Instruments de Physique, Geneva, Switzerland, and being marketed in the United States by the R. Y. Ferner Co., Investment Building, Washington, D. C., is shown in the accompanying illustrations. The machine combines devices for testing gear wheels for pitch, eccentricity, and the profile of the teeth. Beveled and helicoidal gears, as well as spur gears, with both straight and helical teeth, may be examined with it.

The bed or frame of the machine may be used horizontally for the testing of pitch and eccentricity,



View of Gear Tester, Showing Anvils and Dials for Measuring Eccentricity and Pitch

Gear Tester Turned Up—On End for Making Tooth Profile Measurements



or it may be turned up on end as shown, for measurements of profile. The gear to be tested is mounted on a mandrel between adjustable centers. Dials and contact pieces for examination of the pitch and eccentricity are set on a cross piece which may be adjusted along the ways of the bed. The left-hand dial, of the two shown in the illustration, has a contact point arranged so that it moves only along a radius of the gear wheel. Any variations in its readings consequently indicate the error of eccentricity. The other dial has its contact point arranged so that it moves only tangentially to the wheel and it therefore measures the pitch. The dial micrometers are available graduated either to 0.01 mm. or 0.0005 in.

The contact points or anvils are furnished in four different sizes to measure wheels having moduli varying from 1π to 12π . In testing helicoidal or bevel gears the two micrometers may be revolved on their supports so that their connecting levers will be square to the edges of the teeth. When necessary, the effect of eccentricity in the wheel upon the readings of pitch variations may be eliminated from the readings of the right-hand micrometer by a simple calculation.

For checking the shape of teeth, a disk, the diameter of which corresponds to the diameter of the generating circle of the involute teeth under test, is mounted on the mandrel just below the wheel. The equivalent of a rack engages the teeth of the wheel while the edge of the disk in its rotation moves a rolling table by friction with its straight edge. This table is pressed against the disk by a spring, but in

other respects can move freely, being mounted on three vertical wheels, with two horizontal wheels bearing against another straight edge or bar. The table carries the mounting of the rack and a dial indicator which shows relative motion of the rack and the table, and thus measures any variation of the profile of the teeth from the true involute. Variations in the reading of the pointer are said to show the absolute value of the errors of the profile.

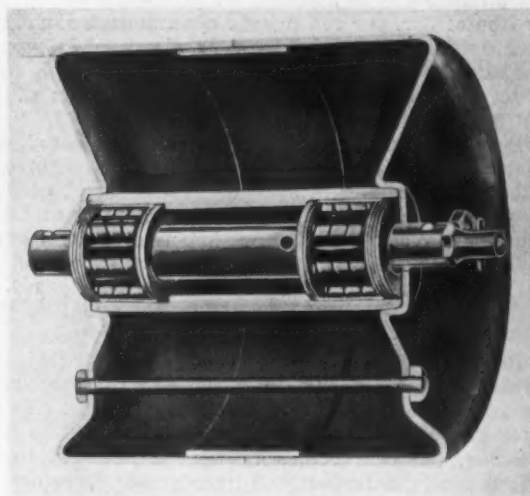
The rack consists of a single tooth, which is designed for a pressure angle of 15 deg., but it is pivotally mounted and may be set by a graduated arc to give other pressure angles if desired. By a spring which applies compression or tension to this tooth both sides of the teeth of the wheel may be tested.

The maximum diameter of gear wheels which can be tested on this machine is 11¼ in. The maximum length of mandrel that may be employed is 15¼ in. (400 mm.). The dimensions of the machine are 29½ x 18 x 13½ in. high. The net weight is 110 lb.

Improved Belt Conveyor Carriers

An improved belt conveyor carrier which, among other features, incorporates special provision for lubrication has been placed on the market by the Stearns Conveyor Co., Cleveland. The shell of the pulley, which is illustrated herewith, is of pressed steel and the edges are rounded to eliminate cutting of the belt.

Inside of the shell and held firmly in tapered ends is a one-piece tube chamfered out as shown to receive two antifriction bearings, and inside of the bearings there is a hardened steel shaft which is held stationary on brackets on the angle frame. This arrangement provides space between the shaft and the tube for a grease chamber, the bearings and grease-retaining washers forming the ends of the chamber as shown. The supply of grease is forced into the chamber and bearings at high pressure through the ends of the hollow shaft, a supply of grease for a period of six months to a year, being said to be provided. The movable parts of the carrier are thus adequately lubricated



Belt Conveyor Carrier of Pressed Steel. Special provision has been made for adequate lubrication

at all times and are protected from dirt and grit, the arrangement being featured as requiring but infrequent attention. Other portions of the invention cover features intended to prevent the collection of dirt and dust on the equipment itself, these parts having been designed to prevent foreign substances gathering and caking on the equipment.

Saving of power through the use of antifriction bearings and light weight pulleys and reduced lubricating and maintenance costs are among the advantages claimed for the improved conveyor carriers.

Complaint Against Eastern Companies

Consumers Assert Some Independent Manufacturers Still
Adhere to Pittsburgh Basis—Commission May Issue
Another Cease and Desist Order

WASHINGTON, Oct. 21.—Complaints have been received by the Federal Trade Commission from consumers of steel in the East that some independent producers in that section continue to sell their products at quotations which are equivalent to f.o.b. Pittsburgh prices. While the sales are made on a delivered price basis, it is maintained that these levels, when figured back and freight allowances made, prove to be the same as those quoted by makers in the Pittsburgh district. In some instances these complaining consumers have submitted to the commission invoices to support their contention. Some of the communications to the commission evidently have been addressed chiefly as a protest against the practice complained of while others go further and seek to learn if there is an immediate remedy. Others want proceedings instituted by the commission against the Eastern manufacturers who, these consumers say, are violating the spirit, if not the letter, of the commission's cease and desist order in the Pittsburgh plus case.

It is believed that the protests indicate that certain consumers in the East are prepared to apply to the commission for a complaint against steel makers, who, it is said, are offending the spirit of the order. The commission, in replying to these protests, explains that the cease and desist order was directed solely against the United States Steel Corporation. Because of this, it is pointed out, independent steel manufacturers are at liberty in a legal sense to adopt any price system they choose. At the same time, it was explained, the commission in issuing the cease and desist order not only expected that the steel industry as a whole would voluntarily follow the United States Steel Corporation policy in complying with the order, but would be compelled to do so by reason of the law of economics and competition. This still is the attitude of the commission. It is felt that the order has not been in effect long enough to bring about a complete readjustment of sale methods but that sooner or later they will be uniform and will be consistent with those of the United States Steel Corporation. To this end, it is maintained, the cease and desist order will have been complied with by the entire industry. The commission, confident in its attitude, is not at this time giving any thought to the matter of issuing a complaint against Eastern manufacturers. At the same time, however, if formal application were made to the commission for a complaint, it is assumed that it not only would be a source of hearings but there are those who think it would be inconsistent with the commission if it actually did not issue the complaint as to Eastern consumers inasmuch as it did so for Western consumers when proceedings were begun against the United States Steel Corporation. But the inference has been gathered that the commission hopes to avoid the issuing of another complaint because of its position that its pending order is sufficient to cover the entire industry and that it will inevitably do so within a reasonable time.

There are those in the trade representing both manufacturers and consumers who accept this view of the commission as being sound or at least as being entirely correct in times when demand for steel is less than productive capacity. But with demand and production on a parity or with the former exceeding the latter, there are producers who still insist that what in effect would be the Pittsburgh plus will be maintained.

The complaint against Eastern consumers apparently had been expected by the commission, in view of reports it had received that there was a practice of selling on the Pittsburgh equivalent, although actually

on a delivered price basis. But the commission is firmly of the opinion that the situation will be only temporary and that Eastern companies if they are doing this, are consciously or unconsciously, depriving themselves of a portion of their legitimate markets. By reason of the fact, it is said, that they are placing themselves on the same price basis as Pittsburgh mills, they cannot penetrate markets as far west as they would by following the order literally because of competition they meet from Pittsburgh mills at points further east than would be the case if due allowance for freight differentials were made.

May Be Forced to Obey

Whether justified or not, the belief exists at the commission that Eastern manufacturers will be forced to obey both the letter and the spirit of the order, if they are not actually doing so now, as a means of preserving their own markets and expanding new ones. This does not take into account the question of mergers, about which the commission will not talk. The reported practice of Eastern companies which have been made the subject of complaints, has given rise to a report that these producers stand ready for, even if they do not invite, a reopening of the case, so that they might take it to the courts in view of the fact that the United States Steel Corporation did not appeal from the commission's ruling. Apparently the commission does not place any credence in such a rumor.

Western consumers who were active in prosecuting the Pittsburgh plus case against the Steel Corporation frequently indicated surprise that Eastern consumers did not join in the movement, although realizing that producing and consuming characteristics in the two sections of the country were quite different. At the same time, it was urged that the principles involved were identical. In view of the development in the Eastern situation, it is said that Western consumers take the position that they were justified in feeling that Eastern consumers would sooner or later complain to the commission. But the East was involved in the case to the extent of the activity of the Associated States Opposed to Pittsburgh plus. This association is represented by 32 States running from the Atlantic seaboard west and has the backing of legislative enactment of some of the commonwealths. It has agreed that the Pittsburgh plus has been abolished in the West and in its survey to be taken up through executive committee will make a report on the results of the abolishing of the Pittsburgh plus. The survey will include not only the West, but the entire country, and it is assumed that it will show the difference in effect in the East and in the West. The report is to be submitted to the legislatures of different States included in the association by not later than Nov. 5. It is also stated that a report may be made either formally or informally to Congress.

The Consolidated Machine Tool Corporation has curtailed operations at the machine department of its plant at Wilmington, Del., formerly the works of the Hilles & Jones Co., and during the slack period will make alterations and improvements for the expected early resumption. The foundry is continuing production under its regular schedule and will be maintained on the active list indefinitely. The report that this plant will be closed and operations transferred to the Philadelphia works has been denied.

Sheet Business Gained Further in September

Rising tendency in sheet business, which began late in July and continued in the following month, held through September, according to the monthly report of the National Association of Sheet and Tin Plate Manufacturers, although the September gain was not so great over August as August was over July.

September sales jumped approximately 20,000 tons, as compared with August, which showed a gain over July of about 72,000 tons. Shipments last month were about 13,000 tons greater than for August whereas the August gain over July was 26,000 tons. Production in September increased 27,000 tons over that for August. The gain in August as compared with the month before was about 46,000 tons.

Production last month was equal to 75.7 per cent of capacity, as compared with 65.2 per cent in August and 48.7 per cent in July. September shipments were 66 per cent of capacity; those for August 60.7 per cent and July 48.7. The September sales were 79 per cent of capacity, against 71.2 per cent for August and 45.9 per cent for July.

Figures for September and the two preceding months, figures in net tons, make the following comparison:

	1924			1923
	September	August	July	September
Capacity	413,000	401,700	413,000	377,000
Per cent reporting	70.0	72.7	71.7	68.8
Sales	227,520	207,986	135,998	223,556
Production	217,981	190,436	144,291	185,577
Shipments	190,210	177,498	151,255	205,772
Unfilled orders	274,325	236,614	203,440	343,096
Unshipped stocks	81,576	70,094	70,798	84,338
Unshod stocks	43,001	42,635	39,621	29,975

Figures for the quarter ended Sept. 30 compare with those for the same period last year as follows:

	1924	1923	Decrease
Sales	571,404	432,573	*138,831
Production	552,708	594,599	41,891
Shipments	518,964	632,519	113,555

*Increase.

Ruling as to Spotting of Cars Is Approved by Commission

WASHINGTON, Oct. 21.—The Interstate Commerce Commission last week rendered a report concerning the spotting of cars for the Donner Steel Co., Buffalo, in which the commission affirmed a previous finding. It was held that while allowance had been made by common carriers to competitors of the Donner Steel Co. in the Buffalo district for spotting services performed by these competitors, the Donner Steel Co. had not suffered through the refusal of the railroads to make allowances to that company for spotting services. The Donner Steel Co. instituted mandamus proceedings before the Court of Appeals of the District of Columbia, in which it was sought to have the Interstate Commerce Commission award reparation to the company. The court denied the petition.

In its affirming report, the commission said that the evidence shows that prior to Sept. 24, 1917, the date on which the Government fixed prices for iron and steel for the war period, the complainant had no difficulty in disposing of its products and made its sales without special regard to its competitors in the Buffalo rate district, the Lackawanna Steel Co., the Buffalo Union Furnace Co. and the Wickwire Steel Co.

The evidence does not show, the report says, that competitors of the Donner Steel Co. made or controlled the market and that the complainant was forced to meet prices fixed by them. Nor does it appear, says the report, that the maximum prices established by the Government were based upon or bore any relation to the costs of manufacture of complainant's competitors at Buffalo. The iron and steel industry, as a whole, the report points out, including the Pittsburgh and Ohio districts, made the market, and the undue preference accorded to complainant's competitors in and near Buffalo is not shown to have had any definite influence on market conditions. If there had been no

switching services performed or allowances paid to these competitors in the Buffalo rate district, the report states, the record shows that the complainant's situation would not have been altered. The fact that the complainant's competitors at Buffalo were placed in a more favorable position than the complainant in and of itself does not establish that complainant was damaged, the report explains.

Increased Production of Coke

WASHINGTON, Oct. 21.—Consistent with the trend of pig iron output, production of both beehive and by-product coke increased during September, according to the Geological Survey. The total production of coke from retort ovens was 2,543,000 net tons and the rate per calendar day was 84,767 tons, an increase of 8 per cent over August. The plants were operated at 67.2 per cent of capacity. Of the 75 plants now in existence, 68 were active and seven were idle. The output of beehive coke for the month is estimated at 523,000 tons, an increase of 89,000 tons over the preceding month. The total output of all coke was 3,066,000 tons, as against 2,833,000 tons in July, the lowest point touched in the present year. In comparison with September, 1923, however, the month shows a decrease of 33 per cent. Of the by-product coke produced in September, 2,086,000 tons, or 82 per cent, came from plants affiliated with blast furnaces, and 457,000 tons, or 18 per cent, from other plants.

Needles and Pins

Needles, pins, hooks-and-eyes and snap fasteners were produced by 49 establishments in 1923 to the aggregate of \$22,147,468, according to Census Bureau figures. This compares with \$18,896,168 from 68 establishments in 1921. The average number of wage earners advanced from 6542 to 6834 and their wages from \$5,542,404 to \$6,703,079. The horsepower used in 1923 was 10,367 and the coal consumed 24,216 net tons.

Production in 1923 included 142,534 thousands of knitting machine needles, 102,622 thousands of other needles, including sewing machine needles, 582,554 lb. of common pins made of steel wire, and 1,263,734 lb. made of brass wire, 997,594 packs (3360 each) of common pins made of steel wire and 1,488,229 packs (3600 each) made of brass wire, 8,240,326 gross of hair pins made of metal, 1,845,071 gross of safety pins made of steel wire and 6,033,248 gross made of brass wire, 321,024 gross of hooks-and-eyes made of steel wire and 2,236,728 gross made of brass or other wire. Snap fasteners and clasps to the extent of 19,598, 280 gross were produced. Products not covered under the above details amounted to \$6,655,742, or 30 per cent of the total.

Railroad Operations

Revenue freight loaded during the week ended Oct. 4 is reported by the American Railway Association at 1,077,006 cars. The amount of grain and grain products loaded was 71,134 cars, a new high record for this group of commodities. Similarly the merchandise in less than carload lots totaled 259,106 cars, also a new high record. In both these cases the previous high records displaced were made in the preceding week. Total loading of revenue freight for the nine months and four days aggregated 38,780,020 carloads, a decrease of 4 per cent from the 38,383,015 carloads of last year, but a greater amount than for any other year. No shortage of cars is reported.

During the last half of September the railroads repaired and turned out of the shops 33,955 locomotives, or a number approximately half of the total number owned. It was the largest ever repaired during any similar period, being an increase of 376 over the previous high record made during the last half of last March. The number of locomotives in need of repair Oct. 1 was 11,329, or 17.6 per cent of the number on the various lines.

HANDLING BY ELECTRIC TRUCK

Malleable Castings and Ruckstell Axles and Parts
Transported Between Departments in Motor
Car Company

BY H. B. CLEVELAND

AFTER giving considerable study to industrial transportation, the Hall Scott Motor Car Co., Inc., San Francisco, manufacturer of the Fageol safety

coach motor, marine speed engines and the Ruckstell 4-speed axle for Ford automobiles, installed a Baker R&L elevating platform type of electric truck and a Wright-Hibbard light duty elevating platform electric truck, both equipped with ironclad Exide batteries, the Baker R&L truck having 12 cells of 17 plate and the Wright-Hibbard 6 cells of 17 plate.

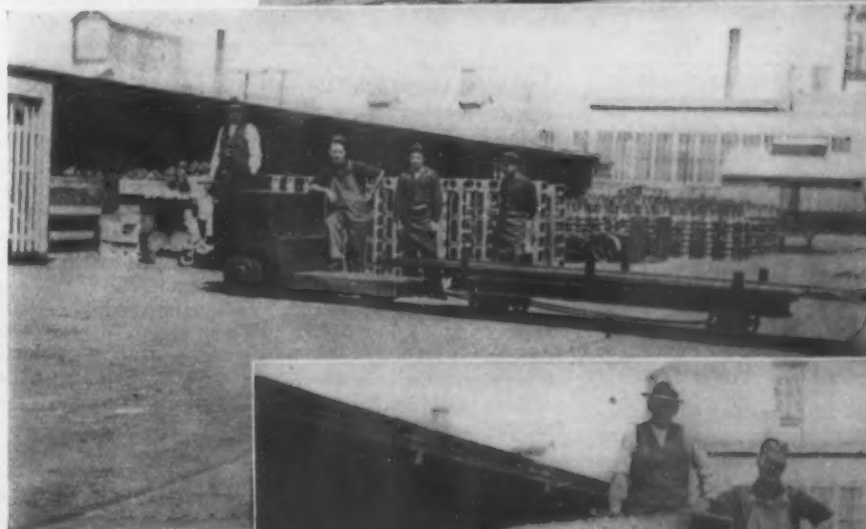
These trucks have been in operation for some time and have shown a marked saving. The Wright-Hibbard truck, operating in the shipping department, is used to transport the finished axles from the assembly



At Left the
Wright-Hibbard
Elevating Truck
Is Handling
Boxes of
Material



At Right the
Baker Truck Is
Carrying a Load
Up the Ramp



"Train" (at
Left) Hauled by
the Baker Truck



Dump Body for
Castings, Car-
ried on Front
End of the
Baker Truck

room to the storage pile in the shipping room or to the warehouse of the Ruckstell Sales Co., one block distant from the plant. Formerly these axles were transported on a small hand lift truck, using three men. With the Wright-Hibbard electric truck and the same wooden skids as used with the hand trucks, only the electric truck operator is necessary, which is a saving of two men, or \$10 a day. In addition, a greater amount of work is done in a shorter space of time, and the hand trucks are released for use in parts of the plant where the short haul makes the electric truck impractical.

The Baker R&L heavy duty elevating platform truck is used in two places; first, for handling small malleable castings as received from the foundry, and second, for handling bar steel stock as received from the mill. The old method of handling the malleable castings was to load approximately 1000 lb. of small castings on a flat truck, and have a crew of men push this truck first to the storage bin, beside the machine in which the castings are machined, and then a long haul out to the yard, where the extra castings were dumped. To unload a car it was necessary to have two trucks with eight men. This resulted in a slow handling and an untidy yard, as well as a loss of castings in the yard.

Under the new method, two dump body skids were constructed, each having a capacity of 2500 lb., and in the yard a ramp was built which enabled the truck to travel over a series of nine bins. The operation now is as follows: the dump body skid is loaded to capacity; the Baker truck picks this skid up from the floor of the box car and transports it through the yard and up

the ramp (which is 30 ft. long with a 14 per cent grade); on arriving at the right bin, the truck operator dumps the loaded body. This operation reduces the handling crew to four men—two loaders in the railroad car, one truck driver and the yard boss. The saving is four men at \$5 each, or a total of \$20 per day. The yard is kept clean and the work is done with greater dispatch. Cars are unloaded in less than one-third the former time and with half the crew.

Another job where the Baker truck is saving labor is in handling the bar steel stock used by the Hall Scott Co. in the manufacture of axles, pins, etc. This steel comes in ¼-in. round and ¾-in. hexagon bars 12 ft. long, tied in bundles. The previous method of handling this material was to have four men load 1900 lb. of bars on a flat truck, which then was pushed to the storage pile by hand. With the Baker lift truck used as a tractor, in conjunction with a 4-wheel trailer, 6 tons of bars now are unloaded at one time and one man transports the load from the car to the pile. If necessary, 10 tons could be handled. The jobs just enumerated are done every day in regular operation.

A typical example of what might be termed extra jobs, that occur frequently in addition to the routine work, is the unloading of 100 boxes of gears, each box weighing 300 lb., or a total of 30,000 lb. of gears. With the hand method it would have taken one man taking one case per trip 4 min. to a trip, or 6½ hr. to transport this load from the receiving platform to the stock room. The Baker elevating platform truck, used as a utility truck with a driver and helper, did the complete job in 2 hr.

French Exports of Iron Ore

In 1923, according to the French Bureau of Information in the United States, French exports of iron ore for the first time since the war reached the 1913 total of 10,000,000 tons. Destinations of these exports in the two calendar years were as follows:

	Metric Tons	1913	1923
Germany and Luxemburg....	4,000,000	.....	.....
Germany .....	.....	167,000	.....
Belgo-Luxemburg .....	.....	6,450,000	.....
Belgium	5,000,000	.....	.....
Sarre .....	.....	2,900,000	.....
Netherlands	500,000*	45,500	.....
Great Britain	425,000	400,000	.....
Miscellaneous	75,000	38,000	.....
Total	10,000,000	10,000,500	.....

*For Germany.

These figures may be compared with exports of only 2,400,000 tons from France in 1908, with an increase averaging 1,500,000 tons yearly up to 1913. The figure dropped to 5,300,000 tons in 1921, largely because of the economic upset of which the Ruhr was the focus. Algiers and Tunis exported 600,000 tons in 1913 to England and the same amount to Germany; in 1923 the total was 1,300,000 tons, almost wholly to England.

French Iron and Steel in August

PARIS, FRANCE, Oct. 10.—Of 220 existing blast furnaces in France on Sept. 1, 133 were in blast (same number as in August), 37 ready to be blown in (against 35) and 50 under reconstruction or repair (against 52). The output of pig iron in August was 655,829 metric tons (636,168 tons in July); including 134,388 tons of foundry iron (142,633 tons) and 462,062 tons of basic iron (444,402). The share of Lorraine in this production amounted to 257,480 tons (252,080 tons in July).

August output of steel was 581,715 tons (564,876 tons in July), including 567,561 tons of ingots and 14,154 tons of castings. The production of basic steel was 377,083 tons (375,705 tons) and the output of open-hearth was 191,843 tons (175,917 tons). The share of Lorraine in this output comes in for 198,721 tons, as against 194,805 tons in July.

Iron and steel trade for the first eight months of 1924 included:

Pig Iron.—Imports: 32,477 tons, as against 42,050

tons for the corresponding period of 1923; exports, 487,221 tons as against 360,442 tons.

Ferroalloys.—Imports, 6467 tons as against 4116 tons; exports, 13,728 tons, comparing with 13,017 tons in 1923.

Iron and Steel.—Imports, 473,132 tons as against 342,559 tons; exports, 1,549,472 tons, as against 1,144,533 tons.

French exports to the United States during the first eight months of 1924 were 11,616 tons of pig iron, 3082 tons of iron and steel, blooms, billets and bars, etc. (35 tons in August) and 4547 tons of rails (1209 tons in August).

Group Insurance Plan of Hubbard & Co.

Group insurance has been instituted at the three Pittsburgh plants of Hubbard & Co., manufacturers of shovels, spades, picks, etc., to the extent of \$1,000,000, the program affecting 800 employees. Most of this amount was issued on a plan whereby Hubbard & Co. and the workers pay the premium jointly. However, \$180,000 of the total amount was issued without cost to 90 employees, whose period of service with the company covers 15 years or more. Individual amounts range from \$1,000 life, death and dismemberment insurance to \$3,000, according to occupation and length of service. Certain classes of workers are entitled to accident and health insurance, carrying weekly benefits of from \$10 to \$15.

Bituminous coal production is reported by the Geological Survey for the week ended Oct. 11 at 10,548,000 net tons, compared with 10,275,000 tons for the previous week and 10,140,000 tons for the week ended Sept. 27. All of these figures are below those for the corresponding weeks of 1923. Production for the calendar year up to Oct. 11 is given as 352,896,000 tons, compared with 432,665,000 tons in the same period last year.

Steel furniture shipments reported by the Department of Commerce amounted in September to \$1,207,786, compared with \$1,184,611 in August, \$1,115,792 in July and with \$1,273,259 in September of last year. Except for the two months immediately preceding, the current figure is the lowest since November, 1922.

EUROPE TAKES FAR EAST ORDERS

Manchuria Rails Placed in France—Japan to Buy Pipe—China Buys Small Lots in Europe

NEW YORK, Oct. 21.—Export to all markets, particularly the Far East, is about as quiet as at any time this year. Chinese merchants, as a result of the civil war, are not inclined to carry any larger stocks than are absolutely necessary and are satisfying immediate needs by purchases from the Pacific Coast shipped out of stock and small orders placed with European makers, principally French and Belgian mills. Although wire shorts are offered at low prices by American wire manufacturers, merchants in China seldom make the usual counter-offer. The merchant market in Japan shows scarcely more activity, but there is still a fair amount of business being transacted because of the large inquiries of municipalities and private companies.

An outstanding inquiry of the past week was the call for bids by the Tokio Gas Co., Tokio, for 1,200,000 ft. of black gas pipe, mostly $\frac{3}{4}$ -in. Bids were opened on Oct. 18. The inquiry of the Kobe Municipal Tramway Bureau for $6\frac{1}{2}$ miles of high T rails and several sets of switches has been postponed until Oct. 20. The recent inquiry of the South Manchuria Railway Co. for 43 miles of 100-lb. rails resulted in a low bid, said to have been \$31.50 per ton, c.i.f. Japan, from the de Wendel works in Lorraine, to which the business was awarded. A recent inquiry from a railroad in Japan calls for a small lot of special type switches.

Recent competition from European makers in world markets has been largely confined to mills in France and Belgium quoting exceedingly low prices. Prices of German sellers have been competitive only occasionally. At present, according to the representative of a large export and import company in Berlin, who is now in the United States, heavy open-hearth rails could be sold to American users at \$37 per ton, c.i.f. Atlantic port, duty paid. There has been some business done with consumers on the Pacific Coast. A total of 5000 tons of 60-lb. rails are reported to have been sold by a German mill to the Pacific Coast of the United States. While the Pont-a-Mousson works in France has sold a fairly comfortable tonnage of cast iron pipe to Pacific Coast users during this year, it is claimed that a German cast iron pipe producer has sold a total of 40,000 tons of water and gas pipe in the first eight months. Importers in touch with German sellers are not inclined to believe that German costs, and as a result quotations, will be higher with the Dawes plan in operation, but look for keen competition from German sources next year.

It has been remarked by exporters dealing with the Far East that recently a number of independent mills formerly only able to quote f.o.b. Pittsburgh prices or f.a.s. prices on tin plate are now quoting c.i.f. Japanese or Chinese port.

Bessemer & Lake Erie Railroad Dock at Conneaut

What is generally conceded to be the most elaborately equipped ore dock in the world is now under construction for the Bessemer & Lake Erie Railroad at Conneaut, Ohio. The work is being done by three different parties. The railroad with its own forces is building a rim on the west and north of the storage space out of open-hearth slag, which on account of its weight is very slightly affected by the waves. The Dravo Contracting Co., Pittsburgh, is building the reinforced concrete dock front and anchorage. The Great Lakes Dredge & Dock Co., Cleveland, is doing the dredging and has had to remove a large quantity of material from in front of the new dock. The work so far authorized covers only the dredging, the new dock front with anchorage, and the open-hearth slag rim on the west and north side.

The designated length of the dock is 2420 ft., and the width 961 ft. Every foot of its walls is founded on bed rock from 27 to 42 ft. below the level of Lake

Erie and 825 ft. of the dock's frontage rests on caissons, while the rest is on piers at 16½-ft. centers, closed by retaining walls of concrete and sheet metal piling, reinforced with steel bars and 100-lb. rails.

Many obstructions were found which made it necessary to change the location of coffer dams and caissons. In one instance, after one was partly completed, parts of an old car ferry and remnants of a dock were found buried beneath the surface.

Moderate Expansion of Plant Operations at Youngstown

YOUNGSTOWN, Oct. 21.—Producers report a somewhat better sentiment among buyers of steel products, and schedules of district interests are holding well, with moderate expansion this week.

The principal change is in the resumption of Mattie blast furnace at Girard of the A. M. Byers Co., Pittsburgh. This stack has been idle for several months, during which it has been overhauled. Its resumption brings the total number of active blast furnaces in the Mahoning and Shenango Valleys to 22, of 45.

Of 120 sheet and jobbing mills in the Mahoning Valley, 84 are scheduled, compared with 79 last week. The Waddell Steel Co. idle several weeks, has four mills on the active list. The Newton Steel Co. is planning to expand operations from 10 to 14 mills, provided the new automobile business is maintained.

The Youngstown Sheet & Tube Co. is operating both of its merchant bar mills, and the Republic Iron & Steel Co. three light bar mills and its 14-16 in. mill.

Hot strip capacity is engaged full, with cold strip mills at 65 per cent. Only one plate mill in the district is active, the 84-in. unit of the Sheet & Tube company at the Brier Hill works.

At its Mercer, Pa., works the American Sheet & Tin Plate Co. is operating eight sheet mills, compared with six recently.

Fabricating plants catering to building construction are slowing down. The Truscon Steel Co. this week instituted an average 20 per cent reduction in production. The General Fireproofing Co. is going at 80 per cent.

Youngstown Improvements Nearing Completion

YOUNGSTOWN, Oct. 20.—Major mill extensions which have been under way in the Youngstown district for the past year or longer are nearing completion, chief among these being the new 3-mill sheet property at the Brier Hill works of the Youngstown Sheet & Tube Co., and the new butt-weld tube mill added by the Republic Iron & Steel Co.

Rolling mill equipment is now being installed in the new sheet mill plant of the Sheet & Tube company, which it is expected will be ready for initial tryout in about three weeks. The principal product of this group of mills will be full finished sheets, and this installation marks the entrance of the Youngstown independent into this field.

These mills bring the total of sheet mills of the Sheet & Tube company to 30.

The new plant will enable the company to work off some of its semi-finishing steel produced at the Brier Hill works.

It is expected that the new butt-weld pipe mill of the Republic company will be ready for initial operations in November.

Employment in September

September employment in manufacturing industries of the country increased 2.1 per cent, according to figures compiled by the Bureau of Labor Statistics. Aggregate earnings of employees increased 3.3 per cent and per capita earnings were 1.2 per cent higher. While only seven industries reporting showed increases in employment in July and 26 in August, September's reports showed increases in 39 of the 52 industries.

European Business Making No Headway

English Feeling Is Better but Prices Still Trend Downward

—Continent Depressed—Belgium and France Report

Business Scarce

(By Cable)

LONDON, ENGLAND, Oct. 21.

FOUNDRY grades of Cleveland pig iron are steadier and there is a better feeling. Some substantial forward sales have been effected, though no widespread revival is likely until after the general election. Hematite has eased further, owing to output in excess of demand, and large stocks of East Coast mixed numbers are offered at 87s. (\$19.49) without much inquiry resulting.

Foreign ore is in slightly better demand, the current price of best Bilbao Rubio being about 21s. 3d. to 21s. 6d. (\$4.76 to \$4.82) c.i.f. Tees. Some sellers are holding for 22s. (\$4.93).

Tendency in finished iron and steel is downward. North-East Coast makers have followed the Scotch reduction in domestic prices of 10s. in plates, angles and joists, but some works are not willing to sell at the minimum figures. Glasgow bar iron has been reduced 10s.

Dorman, Long & Co., Ltd., Middlesbrough, have booked an order for 15,000 tons of plates for Germany. Sentiment generally is slightly more optimistic, but prices may fall further, owing to pressure of Continental competition.

Sheets and Tin Plate

Tin plate market conditions are more active, with buying both for near and forward requirements. Continental interest has broadened substantially since the successful floating of the German loan. Wasters are in keen request. American tin plate still is arriving. Spot has been offered at 23s. (\$5.15) for 20x14's primes and 45s. 9d. (\$10.25) bid for 28x20's for shipment. At the end of September 78 tin plate works were in opera-

tion in the United Kingdom, against 76 last year, representing 417 active mills against 391.

Galvanized sheet works are in need of orders. Thin gages still are neglected.

Black sheets are dull and large orders scarce.

On the Continent of Europe

The position on the Continent is unstable and the outlook obscure. Pig iron is stagnant at about previous levels. Belgian steelmasters are reported anxious for a renewal of the International Rail Syndicate. Meantime the strike of coal miners has been settled.

Krupp has booked 8500 tons of rails for Sweden.

In France, business is quiet. There is some talk of re-establishing the Comptoir des Toiles et Larges Plats.

WAITING FOR GERMAN TREATY

French Iron and Steel Marking Time—Foreign Competition Heavy in Some Lines

PARIS, FRANCE, Oct. 10.—The French market remains idle but, owing to the seasonal replenishing of stocks a few meager orders in pig iron and rolled steel products were booked during the week, both at home and for export. Home competition is still keen and in some sections is depressing prices. French metallurgists are waiting for the conclusion of a commercial treaty with Germany in regard to the exchange of German coke and French ore, but it is felt that negotiations will be hard to conduct if they are to end on reasonable terms. The 1.30 per cent turnover tax foreseen in the French budget for 1925, which applies to the export trade, is viewed with anxiety.

Coke.—From Oct. 1 to 8 the ORCA received 77,693 tons of coke, the daily average being 9700 tons. The price is unaltered.

British and Continental prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.43 per £1, as follows:

Durham coke, del'd..	£1 5s.		\$5.60
Bilbao Rubio ore†...	1 4		5.37
Cleveland No. 1 fdy..	4 5		19.04
Cleveland No. 3 fdy..	4 0		17.92
Cleveland No. 4 fdy..	3 19		17.70
Cleveland No. 4 forge	3 18		17.47
Cleveland basic	4 0		17.92
East Coast mixed....	4 6½	to £4 7s.	19.39 to \$19.50
East Coast hematite..	4 19	to 5 0	22.18 to 22.40
(a) Ferromanganese...	13 10	and 13 0*	60.48 and 58.24
Rails, 60 lb. and up..	9 10	to 9 15	42.56 to 43.68
Billets	7 10	to 8 5	33.60 to 36.96
Sheet and tin plate bars, Welsh	8 12½		38.64
Tin plates, base box..	1 3½		5.26
C. per Lb.			
Ship plates	9 0	to 9 10	1.80 to 1.90
Boiler plates	13 0	to 13 10	2.60 to 2.70
Tees	9 2½	to 9 12½	1.83 to 1.93
Channels	8 7½	to 8 17½	1.68 to 1.78
Beams	8 2½	to 8 12½	1.63 to 1.73
Round bars, ¾ to 3 in.	9 7½	to 9 17½	1.88 to 1.98
Galv. sheets, 24 gage	17 10	to 17 17½	3.50 to 3.58
Black sheets, 24 gage	12 17½	to 13 2½	2.58 to 2.63
Black sheets, Japanese specifications	15 5		3.05
Steel hoops	10 15	and 12 10*	2.15 and 2.50*
Cold rolled steel strip, 20 gage	16 0		3.20

*Export price.

†Ex-ship, Tees, nominal.

(a) Nominal.

Continental Prices, All F. O. B. Channel Ports

(Nominal)			
Foundry pig iron:			
Belgium	£3 9½s.	to £3 10s.	\$15.57 to \$15.68
France	3 9½	to 3 10	15.57 to 15.68
Luxemburg	3 9½	to 3 10	15.57 to 15.68
Basic pig iron:			
Belgium	3 7	to 3 7½	15.01 to 15.12
France	3 7	to 3 7½	15.01 to 15.12
Luxemburg	3 7	to 3 7½	15.01 to 15.12
Billets:			
Belgium	5 0		22.40
France	5 0		22.40
Merchant bars:			
Belgium	5 10	to 5 12½	1.10 to 1.13
Luxemburg	5 10	to 5 12½	1.10 to 1.13
France	5 10	to 5 12½	1.10 to 1.13
Joists (beams):			
Belgium	5 10	to 5 12½	1.10 to 1.13
Luxemburg	5 10	to 5 12½	1.10 to 1.13
France	5 10	to 5 12½	1.10 to 1.13
Angles:			
Belgium	8 0	to 8 5	1.60 to 1.65
¾-in. plates:			
Belgium	6 17½		1.38
Germany	6 17½		1.38
½-in. plates:			
Luxemburg	6 17½		1.38
Belgium	6 17½		1.38

Pig Iron.—The output in August shows a slight progress, which mostly bears on basic and forge iron, while foundry iron remains neglected. Although there is a slight increase of orders, the market is not active and prices tend to stabilization. Chill-cast No. 3 is 290 to 295 fr. (\$15.32 to \$15.58) for medium, 285 fr. (\$15.05) for large and 300 fr. (\$15.85) for small tonnages. The plants refuse to sell beyond October. Export prices are steadier at 320 to 330 fr. (293 to 302 French francs, or \$15.48 to \$15.95); basic is ruling 10 fr. lower.

The hematite section remains hesitant, some buyers finding the difference in the price of this material and that of phosphoric iron still too great. Some plants are fully booked for several weeks, while others are taking orders almost at any price and competition is keen, average prices usually ruling 400 fr. (\$21.13) per ton; while lower rates are obtained in the East. A transaction of electric hematite (5 to 6 per cent Si, 0.60 Mn, 0.05 S, 0.10 P, 2.5 to 3 per cent carbon) has been made at 450 fr. (\$23.77) per ton, Savoie.

Ferroalloys.—The Comptoir price schedule for October shows no alteration on the previous month, with the exception of the 75 per cent grade of ferromanganese, raised by 50 fr. to 1900 fr. (\$100.39), after reacting to 1850 fr. in the beginning of September. With the output of ferrosilicon, reduced prices are inclined to harden at 585 fr. (\$30.90) a ton, Savoie. Some yielding 75 per cent of silicon have been sold at 1880 fr. (\$99.32) in the Haute-Marne district. Norwegian competition in ferromanganese still is sharp, and undercuts both French and British prices on our market; producers seriously think of asking for the revision of customs regulations. Norway offers at 1225 fr. (\$64.70) delivered, or 70 to 75 fr. under the British price. The French price is 1300 fr. (\$68.67), delivered. Spiegel-eisen, 10 to 12 per cent, is worth 500 to 510 fr. (\$26.41 to \$26.95), East.

Semi-Finished Products.—Production of raw steel was increased in August. While the output of basic remained stationary, owing to the excessive price of coke, that of open-hearth showed a noticeable progress. Generally speaking, a spirit of optimism prevails among steel makers, though the volume of trade is only moderate, but they rather anticipate a stabilization of

prices. The home demand for semi-finished material is dull, while some business is done for export, with the United Kingdom principally. Prices are steadier, thanks to the appreciation of sterling. The average prices ruling are:

	Inland	Export, f.o.b. Antwerp
	Fr.	Belgian Fr.
Ingots	36 to 37 (\$19.02 to \$19.55)	435 (\$21.06)
Blooms	38 to 40 (20.07 to 21.13)	460 (\$22.27)
Billets	41 to 43 (21.64 to 22.72)	480 (\$23.25)
Largets		

Luxemburg offers in Great Britain are £4 15s. to £4 18s. (\$21.39 to \$22.05) for blooms; £5 3s. to £5 4s. (\$23.18 to \$23.40) for billets, and there is large amount of business done.

Rolled Steel.—This section is weak and quiet, with little support for the prices and keen German competition in export markets. For instance, an offer for rails issued by a French firm of the East at 525 fr. (\$27.73), f.o.b. Antwerp, was taken by a German firm with a 10 per cent rebate. Beams are a neglected market at 48 to 50 fr. (1.13c. to 1.18c. per lb.); merchant steels rule at 51 to 52 fr. (1.20c. to 1.23c.). The export rates for beams are £5 14s. (483 fr. or 1.14c. per lb.), £5 15s. for bars (487 fr. or 1.15c.); but more currently: £5 15s. 6d. to £5 16s. 6d. (1.16c. to 1.17c.), f.o.b. Antwerp.

Plates and Sheets.—The cheerful tone developed a week ago was not maintained; heavy sheets are quite dull at 70 to 75 fr. (1.65c. to 1.77c.), the lowest quoted being 68 fr. (1.60c.). Large flats are worth 65 to 67 fr. (1.53c. to 1.58c.); light sheets are easier at 105 fr. (2.48c.) basis. The export rates are: £6 17s. 6d. (1.38c.) (German price), as against £6 19s. (1.39c.) (Belgian price); 570 French fr. (1.34c.) for heavy and 680 Belgian fr. (1.47c.) for medium sheets, Luxemburg prices. The Belgians quote also: 3-mm. (No. 11½-gage), 670 fr. (1.45c.); 2-mm. (No. 14-gage), 760 fr. (1.64c.); 1.5-mm. (No. 16½-gage), 880 fr. (1.90c.); 1-mm. (No. 19½-gage), 1040 fr. (2.25c.); ¾-mm. (No. 25½-gage), 1200 fr. (2.59c.).

Wire Products.—Difficult and quiet business, prices showing a tendency to ease. Wire rod is sold at about 58 to 60 fr. (\$30.64 to \$31.70) on the home market and £6 5s. to £6 7s. 6d. (\$28.12 to \$28.69) for export.

AUSTRIA MAKING LESS STEEL

Activity Decreases in Many Lines—Bank Scandal Largely Responsible

VIENNA, AUSTRIA, Oct. 2.—The iron and steel industry in Austria, like other branches of industry, has been badly shaken by the Depositen-Bank scandals, and the attacks in connection therewith on Herr Castiglioni. Although the late Hugo Stinnes bought from Castiglioni half the stock of the Alpin-Montan Co., the leading iron concern, Castiglioni after Stinnes' death was selected president of the company at the wish of Stinnes' heirs. He did not take up any of the new stock issued at the time of the recent increase of capital, but he remained a powerful factor, and was considered in Germany as being permanently allied with the Rhine-Elbe Union.

The best point in the labor market was passed in July, when the number of unemployed in all industries fell to 63,000 against 170,000 in March, 1923. Since July unemployment has increased slightly. Activity in industrial projects, as shown by new capital issues, has declined, but so has the number of insolvencies. Wholesale prices have fallen, the gold index (100 in 1914) having dropped from 140 in August to 135 in September. The foreign trade balance is still heavily against Austria. In the second quarter of 1924 imports exceeded exports by 252,826,000 gold crowns, against 127,955,000 crowns in the second quarter of 1923, the excess being largely due to imports of coal and manufactured goods.

Austrian steel and engineering industries are de-

pressed. The struggle between producers and manufacturing consumers over the new tariff for heavy iron ended in a victory for the latter. The proposed duty on pig iron was abandoned. For semi-finished materials import duties are in principle maintained but the proposed rates have been reduced, in particular for bars; and the Government has obtained authority to suspend duties when home production threatens to be insufficient. In September an iron and steel strike for an all-around 15 per cent wage increase ended in the concession of 10 per cent, with a 20 per cent increase in the lowest wages. Further wage troubles are threatened. The Upper Styrian concerns escaped the strike. The heavy iron and steel branch is insufficiently occupied.

Competition from Germany

German competition is increasing. The engineering branches suffer in particular from German underselling in farm machines, machine tools and tools. For these goods Germans have reduced their prices to Austria since the summer by 10 to 15 per cent. The electrical branches have sufficient work, owing to the activity shown in new power station projects; and it is hoped that the money lately released by the League of Nations for productive aims will largely go to electrical concerns.

Railroad car construction is more active, owing to new State orders, but export orders are not being obtained. The motor car industry reports some improvement. Exports of motor cars to Germany have increased and great attention is being concentrated on light cars. Except to Czecho-Slovakia, which has pro-

hibitive duties, Austrian cars have a good sale in neighboring countries.

Following is Austria's production record for the first half of 1924 (in metric tons):

	First Quarter	Second Quarter	Half Year
Iron ore	216,201	270,158	486,359
Coal and lignite	841,162	664,980	1,506,142
Pig iron	107,899	93,172	201,071
Steel	140,922	112,328	253,250
Rolled and forged goods..	102,415	86,786	189,201

Production in all 1923 was 329,593 metric tons of steel-making iron, spiegeleisen, ferromanganese, ferro-silicon, etc., and 12,282 tons of foundry pig. The Alpin-Montan Co. report shows production of 339,800 tons of pig iron of all sorts against 314,000 tons in 1922, 322,000 tons of steel against 297,500 tons, 198,300 tons of semi-finished material against 200,100 tons, 1,204,500 tons of iron ore against 1,084,000 tons, and 849,300 tons of coal against 889,900 tons. In all Austria four smelting works were in existence, with eight blast furnaces, of which six were in operation. The production of pig iron in the same area in 1913 was 606,600 tons.

The price of pig iron fell slightly in the second half year, that of bars, sheets, wire rods and some other sorts rose. Wages had risen even before the strike, the average for iron employees per shift being 64,000 paper crowns in the first half year and 69,540 crowns in the second, for steel workers 70,075 and 73,865 crowns respectively. The last wage at present exchange is a little over a dollar.

BELGIAN SITUATION NOT SO GOOD

Iron and Steel Business Scarce and Prices Lower —Competition Heavy—Sheet Market Weak

ANTWERP, BELGIUM, Oct. 1.—After having shown a much better tendency the steel market again has lost all signs of revival. Prices are once more discussed. Business is scarce and difficult. Our inland market is not buying, while the foreign market seems not disposed to place large orders. In the meantime makers are getting more and more short of orders and again are compelled to make further price concessions. German prices, mostly low, also contribute to the prevailing weakness of Belgian prices.

For good specification, basis prices for Belgian consumption are (normally understood on cars at makers' works):

	Fr.	Per Lb.
Bars	535 or \$26.00 or 1.18c.	
Joists and U-iron.....	530 or 25.75 or 1.17c.	
Rods	620 or 30.20 or 1.37c.	
Corrugated bars	620 or 30.20 or 1.37c.	
Wire rods	600 or 29.25 or 1.33c.	
Hoops	780 or 38.00 or 1.72c.	
Cold rolled steel hoops.....	1100 or 53.50 or 2.43c.	
Drawn steel, squares	1350 or 66.00 or 2.99c.	
Drawn steel, rounds	1300 or 63.40 or 2.88c.	
Drawn steel, hexagons	1400 or 68.40 or 3.10c.	
Rails	725 or 35.40 or 1.61c.	
Spring steel, best quality....	1075 or 52.60 or 2.39c.	

For export, bars are quoted at £5 15s. and £5 16s. per ton (1.16c. and 1.17c. per lb.) f.o.b. Antwerp. Some makers maintain higher rates but without results. The lowest price for joists accepted (normal shape) seems to be £5 14s., i.e., \$25.50 per gross ton (1.14c. per lb.) f.o.b. Antwerp. Of course, considering the circumstances, prices must be lower for export than for local sales. For instance such prices, compared with the above list, were as follows f.o.b. Antwerp:

	£6 5s. or \$29.00	Per Lb.
Wire rods		
Drawn squares	1175 or 57.20 or 2.59c.	
Drawn rounds	1150 or 56.10 or 2.54c.	
Drawn hexagons	1200 or 59.25 or 2.69c.	

Luxemburg makers, both for inland and for export, maintain nearly the same quotations. Their competition is felt.

Prices for semi-finished steel are as follows:

	Fr.	Per Lb.
Soft Thomas billets	480 or \$23.35	
Soft Thomas blooms	450 or 22.00	
Soft Thomas largets	500 or 24.30	

with nearly the same prices for Luxemburg and Lorraine products. Several Belgian makers abstain from quoting, as they consider these prices too low. England is buying, but offers still lower prices.

Steel bands are quoted at fr. 700 to 710, i.e., about

\$34.50 or 1.56c. per lb. For iron products the following prices are demanded:

	Fr.
Merchant iron No. 2.....	675 or \$28.00
Merchant iron No. 3.....	600 or 29.35
Merchant iron No. 4.....	625 or 30.40

For export No. 2 quality was sold as low as fr. 550, namely \$27, with fr. 580 for No. 3 iron, i.e., \$28.20 both per ton f.o.b. Antwerp. Business is not plentiful and last week's slight increase of prices has not been maintained.

Sheets.—The sheet market is as weak as before. As regards heavy material the Germans still offer at lower prices, while certain Belgian makers have absolutely to book to keep on rolling. Germany competes at quotations no higher than £6 17s. 6d., f.o.b. Continental ports. Belgian makers' prices for this material run £7, i.e., fr 645 or \$31.50 (1.43c. per lb.).

Per contra the market for thinner sheets is in a better condition. Business is available, with prices rather high. Belgian prices are approximately:

	Fr.	Per Lb.
Thomas sheets 0.5 mm. (No. 25 1/2 gage)	1200 or \$59.25 or 2.69c.	
Thomas sheets 1 mm. (No. 19 1/2 gage)	1050 or 51.00 or 2.31c.	
Thomas sheets 2 mm. (No. 14 gage)	780 or 37.00 or 1.68c.	
Thomas sheets 3 mm. (No. 11 1/2 gage)	680 or 33.00 or 1.50c.	
Thomas sheets 5 mm. (No. 6 1/2 gage)	630 or 30.60 or 1.39c.	
Galvanized sheets 0.5 mm.....	2300 or 112.00 or 5.08c.	
Galvanized sheets 1 mm.....	1700 or 83.00 or 3.76c.	
Polished sheets	1500 or 73.20 or 3.32c.	

Pig Iron.—A larger demand, especially from abroad, has appeared. Prices in general have been increased by 25c. to 50c. per ton. No. 3 phosphorus quality is quoted at fr. 340 to 350, f.o.b. Antwerp, or delivered at founder's works. This price works out at about \$16.80 per ton.

Continental Thomas pig iron of approximately Si, 1 per cent max.; Mn, 1 to 1.5 per cent; S, 0.08 per cent max., and Ph, 1.8 to 2 per cent, costs \$16.40 f.o.b. The offered prices, however, are lower, so that business with England (the most important customer for pig iron of this grade) is not developing.

Semi-phosphorus pig iron is quoted at fr. 370, f.o.b. Antwerp, i.e., \$18, but no large business is reported. Belgian hematite (Bessemer) pig iron is too dear. The price is about fr. 470, or £5 2s. 6d., while English hematite pig iron, East coast, is only £4 14s., c.i.f. Antwerp.

British Pig Iron and Steel in September

LONDON, ENGLAND, Oct. 17 (By Cable).—The pig iron production in September was 569,200 gross tons, which was a decrease from the August output of 588,900 tons. Total steel production in September was 645,000 tons, comparing with 527,500 tons in August.

Comparative production figures for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month.....	855,000	639,000
1920, per month.....	669,500	755,600
1921, per month.....	217,600	302,100
1922, per month.....	408,300	486,000
1923, per month.....	619,800	707,400
January, 1924	631,500	690,100
February	612,700	767,600
March	668,600	825,200
April	618,400	711,500
May	650,900	809,700
June	607,800	651,500
July	615,600	693,300
August	588,900	527,500
September	569,200	645,000

The September pig iron output of 569,200 tons compares with an average monthly production of 632,500 tons per month for the first half. The steel output in September of 645,000 tons contrasts with 741,900 tons per month to July 1, this year.

United States imports in American vessels are reported by the Department of Commerce at 33.42 per cent of all water-borne imports, in the first eight months of 1924, compared with 31.42 per cent for the same period of 1923. Exports showed a similar increase, with 38.92 per cent of the value in American vessels in 1924, compared with 37.40 per cent in 1923.

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The March of the Foundry

JUST six years after their notable war-time convention in Milwaukee, American foundrymen met again last week in the same city and building. The contrast between the earlier and later meetings is striking in many respects. It is in a sense a measure of the rapid progress of this great organization and of the metallurgical and mechanical developments in an important industry.

At Milwaukee in 1918 war materials and how to produce them rapidly dominated all the proceedings. Semi-steel shells took up a whole session. Last week improvement of present and development of new foundry products to meet more exacting demands of peaceful use were uppermost. This year's registration exceeded 5000, while six years ago the total was only 2800. In sum and in detail the meeting of 1924 left a lasting impression of the magnitude and vitality of the foundry industry.

Six years ago there was nothing on sand problems; this year the discussion of sand research held the center of the stage. In metallurgy and in practice on the foundry floor progress in recent years has been notable. Six years ago the future of malleable foundry products was a subject of some concern; today, as a result of research, that branch of the industry is on the highest plane in its history, with radical changes in annealing periods probably not far distant. Double heat treatment of steel castings was in its infancy six years ago; today it is common practice for securing the best results. Last week triple annealing of large castings was a new development of much promise.

On the mechanical side the improvement is quite as notable—as seen in the extending field of electrical appliances, in the more rapid operation of molding machines constructed on machine tool lines, and in the perfecting of handling equipment. Last week's convention plainly marks a new high point in the latter-day foundry advance—the most noteworthy advance, perhaps, in the metal working industries in the last two decades.

Concerning Sands

A GREAT deal of credit is due to those energetic and progressive men who have carried forward the investigations on molding sand, reported from time to time at the foundrymen's conventions. They set out to discover the characteristics of a good sand, even to resolve the problem into its elements, so that one could blend local sands and clays into a mixture satisfactory to the molders. A difficult problem indeed! Hard even to state, for the journeymen had always relied upon some rule-of-thumb tests, which were next to impossible to translate into quantitative data. Apparently it was another proof of the saying "The older the art, the less that is really known about it."

The goal of the research has not yet been reached, but a remarkable advance has been made in a few years. It was evident at the outset that whatever else a good molding sand should be, it should have sufficient bonding power to retain the shape of the pattern, it should be porous enough to allow the escape of steam and gases driven back by the hot metal, and it should not melt in the heat or stick to the casting. Evidently it was first necessary to find tests for bond, moisture, permeability and refractoriness—not such tests as scientists already might be using, but tests which could be made in a few minutes, with quite simple apparatus, and right on the job.

Such tests for bond, moisture and permeability have been devised, and have been systematically used in some of the leading foundries long enough to establish their value without question. The ultimate goal of the research has not yet been reached—which is not surprising in the least. Not enough is known about what is responsible for the bond in a sand, for instance, to make it possible to compound a molding sand like a prescription. However, things have gone this far: if a given heap of sand will work satisfactorily, it is possible by means of the tests to reproduce that heap from the original materials time after time, indefinitely. In other words, it is now possible for a foundry to standardize on a certain sand—and reproduce that sand at will.

It is to be expected that the empirical figures for moisture, bond and permeability used for standards by an Eastern plant making brass castings in Albany sand could hardly be expected to give best results in an Illinois iron foundry using local sands. However, that should not deter one from using the tests. A little experimentation with the heaps actually on the floor, and you have your own target to shoot at.

That the effort is worth while may be gathered from some statements made at Milwaukee last week. When the sand is right and is kept right, the rejects and foundry returns drop to half their former number. Not content with this, one plant finds that all its old sand can be reclaimed. It is riddled and then mixed with a determined amount of high-bond local sand in a muller. Several months' operations in this manner have reduced the sand cost per pound of castings by approximately one-half.

A saving of half the sand cost and half the rejects is certainly worth the trouble. We would imagine, however, that the matter could be pressed further. When every one connected with production has been convinced that the sand is no longer at the mercy of changing weather, but is always uniform, certain other causes of foundry trouble can be run to the ground and eliminated. Especially in plants in quantity production.

For instance, suppose a jolt machine should put up a certain mold in 35 jolts. But for no apparent reason, it seems to take today 45 or 50 jolts. The sand is uniform—for it is tested frequently. Therefore, the trouble must be in the machine. The next step is to discover that the air pressure has been reduced, or the machine itself needs some minor repairs.

One of the multitudinous variables in foundry work has thus been brought under control. It ought to be as welcome to the foundrymen as a mooring mast to the ZR-3. From this fixed point many voyages of discovery will be made. Eventually, mystery will be chased out of the foundry.

Steel Dwelling Houses

AN editorial in the *Iron and Coal Trades Review*, London, refers to several steel dwelling houses that have been constructed as models in Great Britain, and discusses the future of steel demand in this connection with the attitude that the building of such houses promises to reach large proportions. The construction contemplated is that of workmen's houses rather than of houses in which the individual taste of the prospective owner and occupant would be embodied; but it is important that the building of any kind of steel houses in Great Britain has reached the stage thus indicated.

The curious contrast is that the United States has done much in skeleton steel construction for large buildings, while Great Britain has not, when on the other hand more interest is shown in Great Britain than in the United States in the use of steel in the smaller structures used as dwelling houses.

The idea itself is old in the United States. Nearly, if not quite, 20 years ago a complete set of clips on fastenings for light beams was devised

by a steel company, and since then much material that could be used, so far as mechanical details go, has been put on the market, but the practical experience is that this construction is in favor with commercial buildings and has not made its way to any considerable extent into dwelling houses.

Our London contemporary in referring to this new use for steel mentions the fact that the British steel industry needs this outlet. It is not behind our own in that respect. Since the war the steel industry of the United States has operated at an average of only about two-thirds of its actual—not theoretical—capacity.

The real problem in putting steel into dwelling house construction is not a mechanical or engineering one. Much work along the necessary lines has already been done and what work may remain can readily be accomplished. The big problem involves purely the human element. Steel cannot be introduced into ordinary dwelling house construction piecemeal. Steel beams cannot be offered to the building trades in expectation that this year builders will put a few steel beams into their houses, and next year a few more, also some other pieces of steel until in the course of time buildings are steel instead of brick and wood. There are too many jurisdictional disputes as it is. When a certain shingle has to be applied by one kind of artisan if it goes on the roof and by another kind when it goes on the side, the path of the steel beam or joist would not be a smooth one.

The way to introduce real out and out steel construction for dwelling houses is for a large construction company to take over the whole proposition, putting itself in position to undertake the complete construction of dwelling houses, offering perhaps stock designs, but being prepared to construct according to individual tastes. Its employees would be men paid by the month and engaged to do whatever work they were instructed to do. The success of such an organization would lie in its overcoming the human element that has prevented reasonable progress being made in dwelling house construction. Much greater risks have been taken in mining ventures than would be involved in this proposition, the point being that men are more ready to take chances with nature than with human nature.

A Labor Paradise

WHAT is a paradise for labor? What conditions would create it? Answers to these questions would be so diverse that it would be more or less a waste of time to try to enumerate their probable range. For a generalization, perhaps the ambition for the most pay for the least work would be most nearly correct. This is reflected in the movement in some quarters for a six-hour day; also in the hope of that tart, but industrially and economically inexperienced philosopher, G. Bernard Shaw, that perhaps some fine day labor will have to toil only two hours out of the 24 in order to get an excellent living.

The labor of most of the world is a long way from such a consummation—desirable or undesirable, as to which there is room for argument; but at certain places in Australia, there is an approach to it.

The Commonwealth of Australia, as every one knows, has been for a fairly long period under labor domination to a greater extent than any other of the English speaking countries. This has been possible, perhaps, from the fact that Australia is essentially an agricultural and pastoral country, its manufacturing industries being relatively few and of small magnitude. It possesses, however, an important mining industry, and in that the evils of labor union domination are clearly apparent; indeed, they have been the source of much trouble through a good many years.

The greatest mines of the commonwealth are those of Broken Hill, which, as a district, is the largest producer of zinc in the world, and not far from being the largest producer of lead also, the two metals existing concurrently in the ore. In the early days of the district, and up to about 20 years ago, these mines were worked for lead alone, the great masses of mixed ores being incapable of beneficiation. If the art of metallurgy were the same as it was 20 years ago there would probably now be no mining at Broken Hill. What made the continuous operation possible was the invention and introduction of the flotation processes of mineral separation, whereby it became possible to separate the zinc and lead minerals existing in mixture previously baffling. The present value of these mines is therefore not so much due to the capitalistic capture of a bounty of nature as it is to the infusion of brains making valuable, and affording a great basis of employment out of, what was previously worthless and of no use to anybody. In passing, the thought may be offered that the same characterization is true of most of the present mines of the world, also of many of its industries.

Returning from that little digression, however, it is clear that labor has no rightful claim upon the produce of the mines of Broken Hill under the terms of the Marxian theory, or any other. Whatever it may be able to extort beyond its fair due is parasitic and nothing else. Of late, union labor at Broken Hill, and it is all strongly unionized there, has been working only 35 hours per week. Not long ago it served notice upon the employing companies that the working hours must be reduced to 30 per week, together with an annual holiday of a fortnight with full pay, and some other conditions. Of course, the companies refused, for irrespective of any question of remuneration they must have an adequate number of hours of work per week in order to produce the ore with which to keep their costly plants, mining and metallurgical, in operation.

Broken Hill is not the most desirable place in the world in which to live. Its climate is hot and dry and its surroundings are dusty and desolate. A simple mind might conceive that a laborer condemned by fate to work there would be moved to work hard, to save a good deal out of the bounteous wages that he can earn, and shake the dust from his feet at the earliest opportunity, making room for another, less fortunate man. But not so with the miners of Broken Hill, who seem to prefer to work only a little. The question will suggest itself: What do these miners do with their spare time? Beyond citing the facts that the hotel and billiard saloon keepers and bookmakers are realizing fortunes and that the royal and ancient

game of two-up is always being played on the tailings dumps, it is difficult to answer. Perhaps the historic answer of the loafer is most adequate, to wit: "Sometimes I sits and thinks, and sometimes I just sits."

Fabricated Steel Runs Ahead

THE report of fabricated steel lettings in September, issued by the Department of Commerce, shows such a gain over those in September of last year as to put this year distinctly ahead in the nine-month comparison, there having been an even break in the first eight months. Contracts last month represented 67 per cent of the fabricating shop capacity, against 60 per cent reported for August and 52 per cent for September of last year.

Prior to April, 1922, the statistics were gathered by the Bridge Builders and Structural Society; then the Department of Commerce took over the compilation. The monthly figures as originally published were revised from time to time as the department secured returns from additional firms. Reports are now made from 190 firms, with capacity of 245,490 tons a month, while the total estimated capacity is 260,000 tons a month for 1923 and 1924, against 250,000 tons estimated for 1922.

Fabricated Steel Bookings in Percentage of Capacity

	1922	1923	1924
January	40	72	72
February	43	77	73
March	77	92	71
April	85	78	65
May	79	56	59
June	73	50	66
July	68	50	70
August	68	58	60
September	64	52	67
October	57	49	..
November	49	54	..
December	60	79	..
Average	63.6	63.9	67.0

Last May there was a popular impression that interest in fabricated steel structures had decreased, on account of costs, and that lettings would diminish. The conclusion proved incorrect. The basis may have been correct, but if so there was compensation by costs declining, for the statistical fact is that in the first four months of this year lettings fell behind those of last year—70.3 per cent against 79.8 per cent—while in the next four months, through August, they ran correspondingly ahead—63.8 per cent against 53.5 per cent. Thus the average for eight months was 67.0 per cent this year, against 66.6 per cent for the eight months of last year.

Now has come September with bookings 15 points above those of the preceding September, whereby the nine-month average is 67.0 per cent against 65.0 per cent for the same nine months of last year.

It might be said that with bookings at only two-thirds of capacity, both years are poor structural years, but against this it must be observed that production of structural shapes in 1923 was 3 per cent above the previous record, made in 1920, and 29 per cent above the ten-year average 1913 to 1922.

On the other hand, this fabricated steel business does not absorb so large a proportion of the structural shapes produced as might be supposed. In 1923, with bookings at 63.9 per cent of a fabricating shop capacity estimated at 260,000 net tons

a month, the quantity was about 1,780,000 gross tons, or 52 per cent as much as the 3,405,197 gross tons of structural shapes reported as produced, yet the fabricated steel is not made up exclusively of shapes, but contains a very considerable proportion of plates and bars.

As an index to the volume of construction work being undertaken, however, reports of fabricated steel lettings are of great value, both from the large expenditures represented and from the fact that this contracting comes first and various other expenditures, for other materials and for labor, come later, so that the fabricated steel lettings are of barometric character. Statistics of car loadings, to illustrate the difference, are a record of what has been done.

PITTSBURGH PLUS ON WAR STEEL

Steel Companies May Be Called Upon to Refund to the Government

WASHINGTON, Oct. 21.—A report that certain Government departments have under consideration the demanding of refunds from iron and steel manufacturers based on the difference between prices paid in war time under the Pittsburgh plus plan and the new method of quoting prices has aroused much interest. It has even been asserted that two large independent steel companies have received statements as to amounts claimed by the Government.

Careful inquiry has revealed only one departmental office where it was definitely learned that the proposal is being given consideration. It was stated that the Finance Division of the War Department is studying the matter, but in the absence of Capt. L. L. Simms, who had charge of it, little information was obtainable. It seems probable that the proposal so far is not a co-ordinated policy on the part of the various Government departments which bought the largest tonnages of iron and steel during the war. At some divisions it was stated that nothing was known about the matter. Officials of the Navy Department and the Shipping Board apparently knew nothing about it. There is much speculation as to whether a general plan is being developed and, if so, whether it would ultimately involve all Government departments that purchased steel under agreed prices during the war where they were fixed on an f.o.b. Pittsburgh basis, as a great percentage of the tonnage was, barring the period when plates, shapes and bars were bought on Chicago as well as Pittsburgh bases. Such a general plan would call for the refunding of a very large amount of money and the steel companies undoubtedly would appeal to the courts.

Consideration of the demand for refunding, although entirely unexpected by the public, is said to be in harmony with court and department rulings in past years. Notable among them are rulings prepared for purchasing departments, such as the War Department, by former Comptroller of the Treasury W. W. Warwick. Judge Warwick held in effect that unless steel actually was made in the Pittsburgh district, the Government was not obliged to pay f.o.b. Pittsburgh prices, despite the terms upon which prices for war materials were agreed upon between the Government and the industry, calling principally for f.o.b. Pittsburgh levels. Typical of such rulings by Judge Warwick was one involving the Pittsburgh base in which he said:

"The form of contract is thus uncertain in the price which the Government is to pay, and by its terms may require payment for a service never performed by the

CORRESPONDENCE

Foreign Sheets and Bars Unsatisfactory

To the Editor: There has been considerable comment in the press on the fact that foreign steel has been sold to Eastern iron and steel jobbers. This corporation bought a small tonnage of European steel bars and sheets and found the material very unsatisfactory. It was not only poorly rolled but a large percentage of it was bent in transportation.

We have decided not to reorder, as the product does not compare with the steel rolled by the American steel mills.

DAVID H. SMITH & SONS, INC.

Brooklyn, N. Y., Oct. 17.

contractor. No contract can lawfully require a payment of the public moneys in excess of the service actually performed." In substance, Judge Warwick made the point that the Government was not required to pay for freight from Pittsburgh unless it actually was involved in delivery of materials. In this and other rulings, he strongly condemned the practice, but not until the Federal Trade Commission had issued its cease and desist order in the Pittsburgh plus case did the refunding proposition receive attention.

Coal Consumption in September

There was an increase of about 800,000 tons in the consumption of coal in September, a slight change when compared with one of 4,000,000 tons in August over July, according to figures compiled by the National Association of Purchasing Agents. It is significant, however, to note that the smaller companies showed an increase in September, while the larger ones consumed about the same tonnage as in August. This may be a good indication, since small concerns are more mobile and more sensitive to changing conditions. On Oct. 1 stocks of coal on hand were about a million tons greater than on Sept. 1. Production of bituminous coal in September gained 5,665,000 tons over the August output.

Government reports show the production of beehive coke for the week ended Oct. 11 was about 129,000 net tons, against 138,000 tons in the preceding week. Coke produced in September required 4,479,000 tons of coal.

President Campbell Predicts Years of Serious European Competition

YOUNGSTOWN, Oct. 21.—This country faces in the next ten years serious competition from European manufacturers, states President James A. Campbell of the Youngstown Sheet & Tube Co.

"The world war demoralized European credit and industry to such an extent we have had little foreign competition for 10 years," he states. "But the adoption of the Dawes plan, the international loan to Germany of \$200,000,000 and the stabilizing of German currency by the adoption of the Rentenmark, will change this situation.

"We may expect strenuous efforts on the part of Europe to recover her foreign markets, which will make our tariff policy highly important."

The construction of a proposed industrial railroad by independent steel makers in the Youngstown district has been given impetus by reason of the new pricing developments in the steel industry. Proponents of the suggested line from Youngstown to the Ohio River, and from Youngstown to Lake Erie, point out that it would enable independents in the Valley to save large sums annually on their freight bills.

Iron and Steel Markets

PRE-ELECTION DULLNESS

Light Demand Apart from Railroad and Structural Work

Buying for Stock May Follow Election—Prices Show Points of Weakness

The steel trade sees ahead of it two weeks of quietness, in view of the evidence it has had in the past three weeks that buyers are doing no speculating on the election outcome. Both in pig iron and in finished steel manufacturing consumers are making even closer connections with furnaces and rolling mills, and keeping their own stocks down—a condition that leads the more confident producers to look for a fair run of buying for stock after the first week of November.

It is an uninteresting market as matters stand—production jogging on at about the September rate, prices changing little, though tending to weakness, and current buying giving no indication of an early change in the channels of ultimate consumption.

It is agreed that the effect of the new method of quoting prices could be better measured by this time but for the setting in of the pre-election lull. Some disappointment has been expressed by buyers, particularly in districts more remote from Pittsburgh, and the possibility of action at Washington extending the cease and desist order to producers other than the Steel Corporation has been considered.

One price change of the week represents an advance, the leading wire interest having put up cold-rolled screw stock from 2.70c. to 2.75c., Cleveland. There is some expectation of like action on the Chicago price of tin plate, as independent makers are quoting \$5.70 per base box there, or \$1 a ton more than the price of the American Sheet & Tin Plate Co.

Irregularities in delivered prices at points where certain mills can compete only by absorbing freight are more in evidence. In billets and bars low prices are reported, some billet transactions figuring back to less than \$34, Pittsburgh, whereas mills in that district have been holding to \$36.

Rail orders are going to the mills in line with announcements of several weeks ago. The Union Pacific has just contracted for 55,000 tons, but deliveries are not wanted until next year. The New York Central order, totaling 184,650 tons, is like the past year's in having an option on the tonnage above 150,000.

Most automobile plants are running close to recent schedules, but Ford and Dodge outputs are somewhat reduced. Capacity for making parts is in excess, and makers of forgings and axles have named very low prices.

An automobile spring manufacturer has inquired for 10,000 tons of spring steel, for delivery through 1925, but producers are not yet ready to name prices beyond Jan. 1.

There is one new car inquiry of moment—3200 freight and 50 passenger cars for the Chicago & Northwestern.

Fabricated steel business in September, as reported to the Department of Commerce, amounted to 160,000 tons, and the month is thus put down at 67 per cent of the country's capacity, while August was a 60 per cent month. For the nine months the average has been 67 per cent. Building the country over has taken more rather than less iron and steel than in 1923.

Sheet mills make a good showing for September, production of the independent companies reporting being at 75.7 per cent of capacity. Sales were at 79 per cent of capacity and shipments—519,000 tons—at 66 per cent.

Wrought pipe operations, due to the steady falling off in orders from the oil country, are now at about 60 per cent, whereas early in the year this was the best of the finished steel lines.

Pig iron prices have softened in eastern Pennsylvania and Pittsburgh, and large buyers have been able to obtain concessions. Basic, nominally \$19, has sold at \$18.50 at Valley furnace. The smaller melters are still keeping out of the market except to meet urgent requirements, but indications are that a more general buying movement will not be delayed much longer.

The Carnegie Steel Co., has added two blast furnaces to the active list, and one independent furnace in the Youngstown district has blown in.

A large independent company announces definite plans for sheet, wire rod and wire mills in the Chicago district. Under Pittsburgh basing it has been shipping to that district from its Youngstown, Ohio, mills.

Pig iron, according to THE IRON AGE composite price, remains at \$19.46, for the tenth successive week. One year ago it was \$22.96. Finished steel remains for another week at 2.46c. per lb.

Pittsburgh

Buyers Hold Back, Awaiting Results of Presidential Election

PITTSBURGH, Oct. 21.—The proximity of election is having the usual effect upon steel business. Although steel makers express absolute confidence that the outcome will be favorable, there evidently is not the same feeling among consumers, who generally have shown a tendency to hold back on new commitments. Hopes are expressed that the lull will be short lived and that business will resume its forward march soon after Nov. 4.

Meanwhile, steel plant operations are holding close to the recent average of about 60 per cent of capacity and blast furnace operations have been increased by the starting of two stacks of the Carnegie Steel Co. and the furnace of the A. M. Byers Co. at Girard, Ohio. These

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
No. 2X, Philadelphia...	\$21.76	\$21.76	\$21.76	\$23.76
No. 2, Valley furnace...	19.50	19.50	19.50	23.00
No. 2, Southern, Cin'ti...	21.55	21.55	21.55	24.05
No. 2, Birmingham, Ala...	17.50	17.50	17.50	20.00
No. 2 foundry, Chicago...	20.50	20.50	20.50	25.00
Basic, del'd, eastern Pa...	20.00	20.00	20.00	24.50
Basic, Valley furnace...	19.00	19.00	19.00	23.00
Valley Bessemer, del. P'gh	21.76	21.76	21.76	26.76
Malleable, Chicago*	20.50	20.50	20.50	25.00
Malleable, Valley	19.50	19.50	19.50	22.50
Gray forge, Pittsburgh...	20.76	20.76	20.76	24.76
L. S. charcoal, Chicago...	29.04	29.04	29.04	30.04
Ferromanganese, furnace.	95.00	95.00	95.00	110.00

Rails, Billets, Etc., Per Gross Ton:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
O.-h. rails, heavy, at mill.	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	35.50	36.00	36.00	40.00
O.-h. billets, Pittsburgh...	35.50	36.00	36.00	40.00
O.-h. sheet bars, P'gh...	37.00	37.00	37.00	42.50
Forging billets, base, P'gh	40.50	41.00	42.00	47.50
O.-h. billets, Phila...	41.17	41.17	41.17	45.17
Wire rods, Pittsburgh...	45.00	46.00	46.00	51.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	1.00	2.00	2.00	3.40
Light rails at mill...	1.85	1.85	1.85	2.25

Finished Iron and Steel, Per Lb. to Large Buyers:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
Iron bars, Philadelphia...	2.32	2.32	2.32	2.67
Iron bars, Chicago...	2.10	2.10	2.15	2.40
Steel bars, Pittsburgh...	2.00	2.00	2.00	2.40
Steel bars, Chicago...	2.00	2.00	2.00	2.50
Steel bars, New York...	2.34	2.34	2.34	2.74
Tank plates, Pittsburgh...	1.80	1.80	1.80	2.50
Tank plates, Chicago...	2.00	2.00	2.00	2.60
Tank plates, New York...	1.94	1.94	1.94	2.74
Beams, Pittsburgh...	1.90	1.90	2.00	2.50
Beams, Chicago...	2.00	2.00	2.00	2.60
Beams, New York...	2.14	2.19	2.24	2.74
Steel hoops, Pittsburgh...	2.50	2.50	2.60	3.15

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market report on other pages.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
Sheets, black, No. 28, P'gh	3.50	3.50	3.50	3.75
Sheets, black, No. 28, Chicago district mill...	3.60	3.60	...	...
Sheets, galv., No. 28, P'gh	4.60	4.60	4.60	5.00
Sheets, galv., No. 28, Chicago district mill...	4.70	4.70	...	...
Sheets, blue, 9 & 10, P'gh	2.70	2.70	2.70	3.00
Sheets, blue, 9 & 10, Chicago district mill...	2.80	2.80	...	...
Wire nails, Pittsburgh...	2.75	2.75	2.75	3.00
Wire nails, Chicago district mill...	2.85	2.85	...	...
Plain wire, Pittsburgh...	2.50	2.50	2.50	2.75
Plain wire, Chicago district mill...	2.60	2.60	...	...
Barbed wire, galv., P'gh...	3.45	3.45	3.45	3.80
Barbed wire, galv., Chicago district mill...	3.55	3.55	...	...
Tin plate, 100-lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$5.50

Old Material, Per Gross Ton:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
Carwheels, Chicago...	\$17.50	\$18.00	\$18.50	\$17.50
Carwheels, Philadelphia...	17.50	17.50	18.00	19.00
Heavy steel scrap, P'gh...	18.50	18.50	18.50	18.00
Heavy steel scrap, Phila...	16.50	16.50	17.00	15.00
Heavy steel scrap, Ch'go...	16.00	16.00	16.50	13.75
No. 1 cast, Pittsburgh...	18.00	18.00	18.00	18.50
No. 1 cast, Philadelphia...	17.50	17.50	18.00	19.00
No. 1 cast, Ch'go (net ton)	17.50	17.50	18.50	18.50
No. 1 RR. wrot. Phila...	17.50	18.50	19.00	17.00
No. 1 RR. wrot. Ch'go (net)	14.00	14.00	15.00	12.50

Coke, Connel'sville:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
Per Net Ton at Oven:				
Furnace coke, prompt...	\$3.00	\$3.00	\$3.00	\$3.75
Foundry coke, prompt...	4.00	4.00	4.00	4.75

Metals, Per Lb. to Large Buyers:	Oct. 21, 1924	Oct. 14, 1924	Sept. 23, 1924	Oct. 23, 1923
Lake copper, New York...	13.25	13.25	13.25	13.12½
Electrolytic copper, refinery	13.00	13.00	12.75	12.50
Zinc, St. Louis...	6.40	6.30	6.12½	6.32½
Zinc, New York...	6.75	6.65	6.47½	6.67½
Lead, St. Louis...	8.15	7.92½	7.85	6.55
Lead, New York...	8.25	8.00	8.10	6.85
Tin (Straits), New York...	51.00	50.25	46.37½	41.25
Antimony (Asiatic), N. Y.	11.75	11.00	11.00	8.00

THE IRON AGE Composite Prices

Oct. 21, 1924, Finished Steel, 2.460c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 83 per cent of the United States output of finished steel.	Oct. 14, 1924, 2.460c.
	Sept. 23, 1924, 2.474c.
	Oct. 23, 1923, 2.775c.
	10-year pre-war average, 1.689c.

Oct. 21, 1924, Pig Iron, \$19.46 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.	Oct. 14, 1924, \$19.46
	Sept. 23, 1924, 19.46
	Oct. 23, 1923, 22.96
	10-year pre-war average, 15.72

2024 to Date	High	Low	2023	High	Low
2.789c, Jan. 15	2.460c, Oct. 14	2.288, Feb. 26	2.824c, April 24	2.446c, Jan. 3	2.077, Nov. 20

additions bring the total now in blast to 74 out of 139 in this and nearby districts.

The report of a lighter demand embraces all finished products. The most significant price change of the week is the announcement of the American Steel & Wire Co., advancing the Cleveland base price of cold-finished steel bars \$1 a ton to 2.75c. This advance at Cleveland puts Pittsburgh district mills on a more nearly equal footing with Cleveland mills in the Cleveland and Detroit districts, where consumption of screw stock is so heavy. There are intimations that other adjustments in the Steel Corporation basing prices are immediately ahead, specific reference being made to the Chicago price of tin plate. At least two independent

makers of tin plate are quoting a base of \$5.70, delivered Chicago, or \$1 a ton above the price of the American Sheet & Tin Plate Co.

Local prices are holding generally at recent levels, except on billets, slabs and steel skelp, but prices quoted here are to a very large degree entirely local; that is, they are not readily obtained in the neutral or twilight zones, where outside mills are in position to compete. Entire familiarity with freight rates from all producing centers to all destinations is not yet an accomplished fact and there are some wide price variations as a result of that condition, notably in wire and sheets. Pittsburgh mills are not surrendering old customers at distant points because of the changed method

of quoting and are absorbing freight in holding old accounts until new ones more favorably located in respect to freight charges are found.

The pig iron market not only is dull, but has a somewhat softer undertone. The only sale of basic iron reported in the week was closed at a price of \$18.50, Valley furnace base, as against \$19, the recent nominal quotation. Middle interests have been able to cover against short sales of foundry iron at \$19, Valley furnace, for No. 2, or about 50c. lower than was recently possible.

Resumption of two merchant blast furnaces running on Connellsville coke does not appear to have stimulated that market. The scrap market still reflects the recent Steubenville, Ohio, delivery prices, holding largely because of a demand from dealers who went short of the market.

Pig Iron.—A Pittsburgh district sheet maker recently bought 2000 tons of basic iron for early delivery and was able to secure it at \$18.50, Valley furnace base. This is the largest sale of the week and the only one of any importance that has been made. The price is probably more representative of today's possibilities for iron for early delivery than a higher one, although there are probably no merchant producers whose costs are as low as \$20 a ton when overhead charges are added to the material and labor. Most producers of foundry iron still are quoting \$19.50 to \$20 furnace for No. 2 grade, but demands are so few and small that there is not much doubt that if it would produce an order of fair size for early delivery \$19, Valley furnace, could be done. There was one sale involving about 300 tons of foundry grade to a middleman at \$19 for base grade, but as yet no direct sales to consumers have been made that low. The Carnegie Steel Co. has blown in one Duquesne and one Lucy furnace, giving it a total of 32 furnaces out of 58 in blast. The tonnage average is much higher than the numerical indication because most of the furnaces in production are those of large capacity.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$19.00
Bessemer	20.00
Gray forge	\$19.00 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	19.50
Low phosphorus, copper free....	27.00 to 28.00

Iron and Steel Bars.—The market here is fairly well defined at 2c. base Pittsburgh mills for merchant steel bars. No large individual tonnages are being offered, but there is a fairly steady run of small lot business. Reinforcing bars also are selling at 2c. in small lots with the usual preferential to large contract buyers. Refined iron bars are holding at recent levels with a fair demand chiefly in connection with railroad car business.

Structural Material.—On strictly local business and on tonnages for shipment a short distance toward the West, 2c. base for large structural beams still is the prevailing price at Pittsburgh mills. On Eastern business, however, 1.90c. is being done and that price also is appearing in protections to local fabricators figuring on some projects involving a fair amount of steel. The market is not active and structural shops still are completing old orders faster than they are getting new ones. Plain material prices are given on page 1098.

Plates.—There is no more activity now than there has been for several weeks, but prices are reasonably steady at 1.80c. to 1.90c. base, Pittsburgh, because outside mills are not coming into the Pittsburgh territory with tonnages at any less. Prices are given on page 1098.

Bolts, Nuts and Rivets.—Business still reflects the fact that buyers are well covered as the result of heavy specifications against unshipped third quarter business given the producers late last month. There is close observance of quotations, but the test of demand is lacking. Prices and discounts are given on page 1098.

Track Supplies.—Activity still is lacking in all products under this heading, the railroads not showing much

disposition to follow up rail orders with purchases of the fastenings. There is no change in prices of local producers. Prices are given on page 1098.

Ferroalloys.—A few carloads of domestic ferromanganese have been sold at the full price of \$100, furnace, but not to consumers in this immediate district, all of whom are well covered for the present quarter and even beyond at less money. It is doubtful if much of the British material to be shipped into this country over the next three or four months will carry a higher price than \$95, c.i.f. Atlantic seaboard, duty paid, as the recent advance to \$100 was preceded by liberal sales or protections at \$95. An effort is being made to stimulate interest in 50 per cent ferrosilicon, which has been offered at less than \$70 delivered for domestic material, as against \$72 to \$75, recent asking prices. Not much urgency is noted in the demand for spiegeleisen. Prices are given on page 1099.

Fluorspar.—There have been a good many offerings of imported fluorspar in this district lately. English fluorspar analyzing 85 per cent calcium fluoride and 5 per cent maximum in silica offered at \$19.75 per gross ton duty paid, c.i.f. Philadelphia. This would mean a net ton price of about \$17.64 and a delivered price of slightly under \$21 per net ton, as against \$24.75, the delivered price on domestic material of the same grade. Freight from southern Illinois and Kentucky points to Pittsburgh is \$5.25 per ton and from Philadelphia \$3.28.

Semi-Finished Steel.—Definitely lower prices have appeared in this market on billets, rolling and forging, and on slabs, these forms now being available 50c. a ton below the recent minimum quotations, or \$35.50 for slabs and rolling billets and \$40.50 for forging billets. These prices, however, are "good" only in the immediate Pittsburgh area, as at distant points, equalization of freight is usually necessary and this has produced prices at Pittsburgh as low as \$34 and even \$33 for billets. Prices of small billets and of sheet bars still appear to be holding at \$37 in Pittsburgh and at \$37.50 at Youngstown, but those prices are based upon shipments against old contracts rather than on new business, the appearance of which is expected to produce lower prices. Skelp is offered as low as 1.90c. Wire rods still range from \$45 to \$46 base, although the common asking price of most makers is \$46. Prices are given on page 1099.

Wire Products.—Demand is steady, but in no sense anticipatory. Winter, with its moderate consumption, is immediately ahead and a disposition to refrain from stocking up also is checked by a belief among jobbers that higher prices are not likely in the near future, although there is not much inclination to question the assertion that declines from present levels appear unlikely. Moreover, deliveries are so good that another reason for forward buying is removed. In a general way, the trade is becoming accustomed to the new mode of quoting, but it is difficult for sales people to become promptly familiar with freight rates from all shipping points to all destinations and deviations from what are regarded as the regular base prices may be partly explained by this unfamiliarity with shipping charges. This branch of the industry is engaged to about 60 per cent of capacity. Prices are given on page 1098.

Steel Rails.—The local standard rail unit of the Steel Corporation is not yet very well filled with business, even counting the carryover from the first half of the year. Light rail business is quiet with producers in this territory. Inquiries generally are for small lots and coal mine operators, who are the principal buyers, find no trouble in covering their needs at 1.80c. to 1.90c., base, mill, for billet rails. Prices are given on page 1098.

Tubular Goods.—September bookings of standard pipe by the National Tube Co. were the largest of any month this year and that experience was duplicated in boiler tubes, but in the latter product the gain loses significance by reason of the fact that boiler tube business for a long time has been very light. It is the experience of all pipe producers that business in standard pipe is reasonably good, but oil country goods and line pipe have not been doing so well. Butt welding pipe

capacity is about 70 per cent engaged, but such capacity is only about 30 per cent of the country's total pipe making capacity. With lap welding furnaces about 50 per cent engaged, the industry as a whole is producing pipe at the rate of slightly under 60 per cent of capacity. The pipe industry has settled very well to the new mode of quotation and prices are holding everywhere, despite the fact that there is still some weakness in the secondary market. While boiler tube sales have increased, the gain has not been sufficient to bring about any strengthening in prices, which are quite as much in buyers' favor as they have been at any time recently. Discounts are given on page 1098.

Sheets.—A pause in the demand is ascribed to a desire on the part of buyers to postpone commitments pending the result of the Presidential election. Western units of the American Sheet & Tin Plate Co. are getting more business and are having a better operation than Eastern mills, because a good deal of blue annealed sheet business is going to Gary mills for railroad cars. There was one such order recently for 8000 tons and another for 4500 tons is looked for shortly. Blue annealed sheet business generally has been good in comparison with that in other finishes. Incidentally, the high rate of production in relation to capacity as reported by the National Association of Sheet & Tin Plate Manufacturers for last month is due to large annealed sheet orders. That grade can be produced at the rate of about 22 tons per turn, while a production of 7 to 8 tons of black sheets per turn is the average showing. Independent manufacturers are meeting the prices of the leading interest in the Chicago district, and in some instances going them one better, but in a general way the concessions appear to be no greater than they are in this district, where prices of the American Sheet & Tin Plate Co. are being shaded about \$2 per ton by some of the independent producers. Sheet production this week is running at about 70 per cent of capacity. Prices are given on page 1099.

Tin Plate.—The market is quiet in the sense that there are no large current demands, but mills in this district have a fairly large complement of contracts against which specifications are good. This branch of the industry is operating about 60 per cent. Independent companies have not yet all adopted the Chicago delivered price of \$5.65, named by the American Sheet & Tin Plate Co., one other beside the Jones & Laughlin Steel Corporation having a delivered Chicago quotation of \$5.70 per base box. Outside of Chicago consumers generally are paying \$5.50, Pittsburgh, or its equivalent.

Cold-Finished Steel Bars and Shafting.—Occasional orders of fair size are coming to mills in this district from automobile parts makers, who have had some business released by the builders, but general business is only fair and the chief feature of encouragement is the smallness of stocks in second hands, which many believe will mean quick orders upon makers when there is definite improvement in consuming channels. Local makers still quote the market as 2.70c., base, with freight equalized with outside mills when necessary. Ground shafting holds at 3.10c., base, f.o.b. mill, for carload lots. Prices in all districts are given on page 1098.

Hot-Rolled Flats.—Prices on wide material still are unsettled and irregular, depending very largely on the attractiveness of the individual inquiry. Buyers who can use material rolled on jobbing or small plate mills can buy close to 2c., and operators of regular strip mills are not letting prices stand in the way of retaining regular customers. The market is fairly well defined on hoops and bands at 2.50c. to 2.60c. for hoop sizes and \$2 a ton less for band gages. Trading is not overly brisk. Prices are given on page 1098.

Cold-Rolled Strips.—Local makers still quote the market at 4c., base, with freights equalized with outside mills when necessary. Fairly good business is being done because the price is regarded as low.

Coke and Coal.—Purchases by producers who have run a little short of meeting their obligations have resulted in a price for spot furnace coke as high as \$3.15 per net ton at ovens. Consumers, however, have had no

such urgent requirements and have been able to cover them at the recent price of \$3. There seems to be an ample supply of spot foundry coke with prices holding at recent levels of from \$4 to \$4.50 for good brands and about \$1 a ton more for what are called special brands. Coal prices are not responding to larger sales. Mine run steam coal still is priced at \$1.50 to \$2.10 per net ton at mines; coking grade from \$1.60 to \$1.85 and gas coal from \$2 to \$2.25. Steam slack ranges from \$1 to \$1.10 a ton and gas slack from \$1.15 to \$1.30.

Old Material.—Further details of the activity of the Steubenville consumer indicate that total purchases ran well above 10,000 tons of heavy melting grade, taken at prices ranging from \$19 to \$19.50 for shipments to be made in 30 days and from \$20 to \$21.50 for lots for immediate shipment. The emergency needs of this buyer have been satisfied and the best price now obtainable from that source is \$19. Another consumer in the Pittsburgh district is offering \$18.50, and dealers are offering the same price, leaving the market plainly quotable at \$18.50 to \$19 on this grade. Some other mills offering less money lately have not been successful in securing material. Compressed sheets have sold at \$17. Specialties are easier due to the lack of demand from the steel foundries. Heavy axle turnings have moved up slightly in price. Machine shop turnings are weaker and it is hard to move short turnings at materially higher prices than the long ones.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$18.50 to \$19.00
No. 1 cast, cupola size.....	18.00 to 18.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 19.50
Compressed sheet steel.....	16.50 to 17.00
Bundled sheets, sides and ends..	15.50 to 16.00
Railroad knuckles and couplers...	20.00 to 20.50
Railroad coil and leaf spring...	20.00 to 20.50
Low phosphorus blooms and bil- let ends	23.00 to 23.50
Low phosphorus plate and other material	22.00 to 22.50
Railroad malleable	18.50 to 17.00
Steel car axles	21.00 to 21.50
Cast iron wheels	18.50 to 19.00
Rolled steel wheels	20.00 to 20.50
Machine shop turnings	14.00 to 14.50
Sheet bar crops	20.00 to 20.50
Heavy steel axle turnings	16.00 to 16.50
Short shovelling turnings	14.50 to 15.00
Heavy breakable cast.....	16.00 to 16.50
Stove plate	15.00 to 15.50
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought.....	15.50 to 16.00
No. 2 railroad wrought.....	18.00 to 18.50

Court Rules Arrearage in Preferred Dividends Has Precedence

No dividends shall be paid on common stock of the United States Cast Iron Pipe & Foundry Co. until back payments on its 7 per cent preferred stock, now amounting to \$721,370, have been liquidated. So reads the ruling handed down by the Court of Errors and Appeals at Trenton, N. J., last Monday. This opinion supports a previous decision of the Chancery Court and follows from suits brought by a common and a preferred stockholder after the declaration last November of a dividend on each stock. Although the preferred stock in question is not cumulative, a decision was sought to establish whether under the company's charter preferred holders were not entitled to the full 7 per cent return in years when that percentage was earned, irrespective of whether or not it was paid at the time. To afford a test case the company declared the dividend on both classes of stock.

The National Safety Council, 168 North Michigan Avenue, Chicago, is sending out sheets giving illustrations in color which will be used in its Safety Calendar for 1925. The color work is excellently done and the pictures suggest in a striking way the safety measures which the council is getting before workers in all industries.

Chicago

Railroad Buying Still a Leading Factor—Pig Iron Stocks Being Reduced

CHICAGO, Oct. 21.—Railroad buying remains the chief support of the steel market as election day draws nearer. In the main orders from other sources are restricted to early requirements, indicating that users prefer to adhere to a policy of caution until election results are known. A few large buyers who are convinced that the election results will be satisfactory have placed substantial tonnages, thereby calculating to avoid a possible post-election rush for material. Others have tried to protect themselves from such a contingency by attempting to obtain options on steel, but without success.

Notwithstanding widespread hesitancy, local mills are holding the gains of September, which showed an increase of 80 per cent in tonnage booked over August. Railroad orders have contributed largely to the favorable position of mills rolling the heavier products. The Great Northern has placed 900 automobile cars requiring 10,000 tons of plates, shapes and bars, and the Chicago & Northwestern has entered the market for 3200 freight and 50 passenger cars. Chicago's share of the New York Central rail order exceeds 87,000 tons. The Union Pacific has contracted for 55,000 tons of rails, of which 30,000 tons will be rolled here. These rail contracts, however, call for 1925 deliveries and hence will not have an immediate effect on mill operations. Nevertheless, present output of the two leading local producers is at the highest point since last spring, one mill being on a 65 per cent basis and the other operating at an 80 per cent rate. The number of active steel works blast furnaces in this district, however, has been reduced to 18 out of 34, one of the Inland stacks having been blown out for relining.

Pig Iron.—Stocks on furnace yards are steadily being reduced and it is possible that another merchant stack will be blown in next month. Shipments continue to exceed current output, but sales still lag. The trade confidently expects a sharp revival of buying following the election, and it is upon this contingency that the blowing in of additional capacity is dependent. While pre-election hesitancy still pervades the market, some buyers are more confident in their attitude and are placing orders in anticipation of a favorable outcome of the balloting. A Central Illinois melter has closed for 5000 tons of foundry and malleable for first quarter and a local melter has contracted for 1000 tons of malleable for the same delivery. A northern Illinois user is inquiring for 1000 tons of malleable for first quarter and a Wisconsin foundry is in the market for 1000 tons of low phosphorus for that shipment. A Michigan melter is inquiring for 500 tons of foundry for the remainder of the year. Sales of Southern foundry have been confined to 400 tons for barge and rail delivery. Charcoal and silvery are inactive. Prices are unchanged, local foundry and malleable being held at \$20.50 base, furnace, for fourth quarter and \$21 for first quarter.

Quotations on Northern foundry, high phosphorus, malleable and basic iron are f.o.b. local furnaces and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards.

Northern No. 2 foundry, sil. 1.75 to 2.25	\$20.50
Northern No. 1 foundry, sil. 2.25 to 2.75	21.00
Malleable, not over 2.25 sil.	20.50
Basic	20.50
High phosphorus	20.50
Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago ..	29.04
Southern No. 2 (barge and rail) ..	22.18
Southern No. 2, sil. 1.75 to 2.25 ..	\$23.51 to 24.01
Low phos., sil. 1 to 2 per cent, copper free	31.79
Silvery, sil. 8 per cent.	34.29 to 35.29
Electric ferrosilicon, 14 to 16 per cent	42.92

Ferroalloys.—Ferromanganese has been inactive here, but sales in other districts have established the new price of \$100, seaboard. Outside of an inquiry for one carload, spiegeleisen is dull.

We quote 80 per cent ferromanganese, \$107.56, delivered; 50 per cent ferrosilicon, \$75, delivered; spiegeleisen, 18 to 22 per cent, \$39.56, delivered.

Plates.—Railroad car buying continues to be the sustaining influence in the plate market. A local mill has booked nearly 10,000 tons of plates, shapes and bars for 900 automobile cars placed by the Great Northern. The Chicago & North Western has decided to buy 3200 freight cars and 50 passenger cars, and the Santa Fe is about to enter the market for an even larger total. No outstanding oil storage tank awards are reported, but tank builders are active buyers of steel, having placed 5000 tons of plates with a Chicago mill during the past week. In contrast with tonnage coming from the two most conspicuous consumers of plates, the railroads and tank fabricators, business from miscellaneous sources is light, indicating perhaps a tendency to delay buying until after election. Prices are unchanged.

The mill quotation is 2c. to 2.10c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Structural Material.—Fabricating awards for the week were numerous, although individually small, aggregating nearly 6000 tons. A number of big projects are still pending, notably the South Water Street improvement work and the Eitel Brothers Building, Chicago, but in general, prospective work is declining as winter approaches. Plain material prices are unchanged.

The mill quotation on plain material is 2c. to 2.10c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Wire Products.—Although buyers still find it unnecessary to order ahead, because of the early deliveries available from the mills, their specifications are showing a steady increase, indicating an expansion in current consumption. On the other hand, some users are impressed with the lowness of present quotations and are seriously considering the advisability of laying in heavier stocks as a protection against a possible advance following a post-election buying movement. Prices, which are shown on page 1098, appear to be firm. Irregularities recently reported were largely due to the confusion of independent mills in becoming adjusted to the new bases.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed, \$3.05 per 100 lb.; common wire nails, \$3.15 per 100 lb.; cement coated nails, \$2.40 per keg.

Rails and Track Supplies.—Rail buying is the outstanding feature of the market. The New York Central has ordered 184,650 tons distributed as follows: 70,600 tons to Illinois Steel Co., 16,850 tons to Inland Steel Co., 80,200 tons to Bethlehem Steel Co., and 17,000 tons to Carnegie Steel Co. The Union Pacific has closed for 55,000 tons, of which 25,000 tons went to the Colorado mill, 22,500 tons to Illinois Steel Co. and 7500 tons to Inland Steel Co. This road has also placed 5000 tons of tie plates, 25,000 kegs of spikes and 5000 kegs of bolts divided three ways among the aforementioned mills. The final distribution of the Wabash rails, mentioned last week, was as follows: 10,000 tons to Illinois Steel Co., 4000 tons to Inland Steel Co., and 1000 tons to Bethlehem Steel Co. The Chesapeake & Ohio is expected to place orders this week for 30,000 tons of rails.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled from billets, 1.80c. to 1.90c., f.o.b. makers' mill.

Standard railroad spikes, 2.80c. mill; track bolts with square nuts, 3.80c. mill; steel tie plates, 2.30c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.45c. base, and track bolts, 4.45c. base.

Bars.—Soft steel bar specifications are liberal, although new buying is hesitant. As the Presidential election approaches, however, the market is showing mixed tendencies. Some of the larger buyers have discounted a favorable outcome of the election and are placing substantial orders now to get the benefit of better deliveries and lower prices than may be available if a post-election buying movement develops. Others are buying for immediate requirements only, preferring not to anticipate their needs. The diversity

of sentiment among consumers is indicated by the receipt of a number of inquiries for first quarter delivery. Mills, however, are disinclined to take business for that shipment at this time. Farm implement makers are specifying more freely and are encouraged by the increasingly favorable outlook for the sale of their products. Automobile production is holding its own, but is not expanding. Motor car builders generally are adhering to the policy of limiting output to actual sales. Steel buying in the Detroit district, however, is holding up to the September average, which was 60 per cent above that of August. Soft steel bar prices show no change. Bar iron quotations are also unaltered, but bookings of local mills during the past week were the best for a considerable period. Rail steel bar business continues to show gradual improvement, with better orders coming from the barn equipment, fence post and bed manufacturers and from the farm implement industry. Shading of the market under 2c. mill, appears to have been confined to a few large reinforcing bar sales.

Mill prices are: Mild steel bars, 2c. to 2.10c.; common bar iron, 2.10c. to 2.15c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.80c. for rounds and 4.30c. for flats, squares and hexagons; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.10c. to 2.25c.

Bolts, Nuts and Rivets.—The market remains inactive, but fourth quarter specifications have been received from the farm implement makers who had specified heavily at the old prices until the very end of the preceding quarter. This is taken to indicate that operations in implement plants have increased faster than anticipated. They are now estimated at from 50 to 60 per cent. Stove makers have also shown some interest in the market. Bolt and nut quotations are firm, but rivets are unsteady, small rivets ranging from 70 and 10 and 5 off to 70 and 10 off. For mill prices see page 1098.

Jobbers quote structural rivets, 3.65c.; boiler rivets, 3.85c.; machine bolts up to $\frac{3}{4}$ x 4 in., 60 per cent off; larger sizes, 60 off; carriage bolts up to $\frac{3}{4}$ x 6 in., 55 off; larger sizes, 55 off; hot pressed nuts, squares and hexagons, tapped, 54 off; blank nuts, 54 off; coach or lag screws, gimlet points, square head, 65 per cent off.

Cast Iron Pipe.—This market is quiet with prices weaker. Detroit has placed 115 tons of large diameter pipe with the Lynchburg Foundry Co. Evansville, Ind., takes bids Oct. 24 on 350 tons of 6- and 8-in. class C. Roselle, Ill., takes contractors' figures today on 400 tons. Elmhurst, Ill., took contractors' bids yesterday on 100 tons.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$54.20 to \$55.20; 6-in. and over, \$50.20 to \$51.20; Class A and gas pipe, \$5 extra.

Sheets.—Following the decision of outside mills to meet the new Chicago zone prices, the rush to place orders with Chicago district producers has subsided and many buyers are again looking to their former regular sources of supply. There is no question, however, that local mills have benefited by the recent turn of events. A leading Chicago producer is now operating at capacity, but it is not yet snowed under with orders. On the whole, it may be said that buyers have resumed a cautious attitude and are confining their purchases to immediate needs pending the outcome of the election.

Chicago delivered prices from mill are 3.65c. for No. 28 black, 2.85c. for No. 10 blue annealed, 4.75c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.80c. base for blue annealed, 4.50c. base for black, and 5.50c. base for galvanized.

Steel Pipe.—Demand for standard pipe, although limited to immediate requirements, bulks large in the aggregate. It is evident, however, that buyers lack confidence, as they have practically no stocks and expect almost immediate shipment when they place orders. This works a hardship on the mills, as it prevents them from building up a satisfactory backlog. Local mills are operating full, however. For prices see page 1098.

Hot Rolled Strip.—Demand is still hesitant, with prices ranging from 2.40c. to 2.50c., Chicago.

Reinforcing Bars.—Lettings are few and competition continues to bring out low prices. Considerable work is being held back until after election, but it is hoped that conditions will have improved sufficiently by that time to give the market some semblance of stability. Apparently little tonnage is moving at more than 2.10c., Chicago warehouse, and some business has gone at as low as 2c.

Lettings include:

Meyer department store, Springfield, Ill., 800 tons to Concrete Steel Co.

Edward Keogh Printing Co., factory and office building, Chicago, 900 tons to Concrete Steel Co.

Moody Church building, Chicago, 220 tons to Concrete Steel Co.

Pending business includes:

Meyer department store, Springfield, Ill., 800 tons, steel about to be placed.

Crane Co., factory addition, Chicago, 250 tons, general contract awarded to Starrett Bros.

Old Material.—Although consumers are buying little, scrap offerings have subsided and prices are generally firmer. They have not actually advanced, however. Political uncertainty, while still an influence in the market, is receiving less consideration than heretofore. Recent liberal purchases by local mills have largely absorbed available stocks of material, and new supplies are slow in coming out, pending their preparation.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$18.00 to \$18.50
Cast iron car wheels	17.00 to 18.00
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	27.00 to 32.00
Forged steel car wheels	18.50 to 19.00
Railroad tires, charging box size	18.50 to 19.00
Railroad leaf springs, cut apart	18.50 to 19.00
Rails for rolling	17.00 to 17.50
Steel rails, less than 3 ft.	17.50 to 18.00
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.00 to 16.50
Shoveling steel	15.75 to 16.25
Drop forge flashings	13.00 to 13.50
Hydraulic compressed sheets	13.00 to 13.50
Axle turnings	17.00 to 17.50
Steel angle bars	17.00 to 17.50
Steel knuckles and couplers	18.00 to 18.50
Coil springs	19.00 to 19.50
Low phosph. punchings	17.00 to 17.50
Machine shop turnings	9.00 to 9.50
Cast borings	11.50 to 12.00
Short shoveling turnings	11.50 to 12.00
Railroad malleable	18.00 to 18.50
Agricultural malleable	17.00 to 17.50
Per Net Ton	
Iron angle and splice bars	16.50 to 17.00
Iron arch bars and transoms	18.50 to 19.00
Iron car axles	24.00 to 24.50
Steel car axles	17.00 to 17.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	8.50 to 9.00
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.25 to 14.75
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	16.00 to 16.50
No. 1 agricultural cast	16.00 to 16.50
Locomotive tires, smooth	16.50 to 17.00
Stove plate	14.50 to 15.00
Grate bars	14.50 to 15.00
Brake shoes	14.50 to 15.00

Youngstown Sheet & Tube Co.'s Proposed Chicago District Plants

CHICAGO, Oct. 21.—The Youngstown Sheet & Tube Co. has definitely decided to construct sheet and wire rod mills and a wire plant in the Chicago district. The location of the units is still undetermined. Either the lake will be filled in adjacent to the company's steel works at Indiana Harbor, Ind., or property will be utilized adjoining the coke plant at Indiana Harbor, or next to its merchant blast furnaces at South Chicago.

Penn Seaboard to Make Strip Steel

The Penn Seaboard Steel Corporation, Philadelphia, has started melting in its new 50-ton open-hearth furnace at its plant at New Castle, Del. Plans have not been completed for the finishing mills which the corporation will install in its New Castle plant, but it has practically been decided that the new unit will include a hot strip mill, details of which will be announced later.

Boston

Demand for Pig Iron Is Less Active—Scrap Prices Weak

BOSTON, Oct. 21.—The demand for pig iron is less active. A western Massachusetts heater manufacturer is reported to have made tentative inquiries on 1000 to 1500 tons of No. 2 plain iron for last quarter shipment and a central Massachusetts machinery maker on 600 tons No. 2X and 100 tons of malleable. Inquiries otherwise, as well as sales, have been for small tonnages, about equally divided between last quarter and first quarter shipment. The status of prices is uncertain. Certain Buffalo furnace interests are holding firmly on the ordinary run of business, but whenever desirable tonnages appear in the market, prices are shaded. The same may be said of certain eastern Pennsylvania furnaces. Small lots of foreign iron continue to figure in the weekly turnover. Sales the past week included No. 2X Continental at \$21 on dock here, duty paid, and No. 1X Dutch at \$22.25 on dock here, duty paid, last quarter delivery. During the past week, 100 tons of Dutch iron arrived at this port.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia and \$9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25.....	\$23.65 to \$25.15
East. Penn., sil. 2.25 to 2.75.....	24.15 to 25.15
Buffalo, sil. 1.75 to 2.25.....	23.91 to 24.41
Buffalo, sil. 2.25 to 2.75.....	24.41 to 24.91
Virginia, sil. 1.75 to 2.25.....	29.42 to 29.92
Virginia, sil. 2.25 to 2.75.....	29.92 to 30.42
Alabama, sil. 1.75 to 2.25.....	27.10 to 27.60
Alabama, sil. 2.25 to 2.75.....	27.60 to 28.10

Cast Iron Pipe.—Cast iron pipe prices average \$1 a ton lower. Current bookings are small and unimportant, but a number of municipalities are getting up specifications for next winter delivery, while private water companies are feeling out the market for spring delivery, 1925. Prices are now quoted as follows: F.o.b. Boston common rate points, 6-in. to 12-in., inclusive, \$61.10 to \$62.10; 16-in. and larger, \$60.10 to \$61.10; the usual \$5 differential is asked for Class A and gas pipe.

Finished Material.—The market here for plates is \$2.01½ per 100 lb. freight allowed. Demand is light and confined to small tonnages. Shapes are generally quoted at \$2.35½ freight allowed, but on attractive tonnages \$2.26½ can be done. Fabricators are figuring on quite a large number of small jobs, but large ones are scarce. Competition among fabricators is still keen. The market for bars is a shade easier at \$2.26½ per 100 lb. freight allowed. The American Steel & Wire Co. has made Worcester, Mass., a basing point on cold-rolled steel and has advanced its base price \$3 a ton over the old Pittsburgh base. This advance plus the freight practically equalizes the Boston delivered price heretofore quoted on the Pittsburgh plus base. Other New England makers of cold-rolled steel have adjusted their prices, in some instances to below those quoted by the large producers.

Warehouse Business.—Local warehouses have reduced cold rolled steel 10c. per 100 lb. to \$4.05 to \$4.55, and blue annealed sheets 25c. to \$3.91½ base. Prices otherwise remain as heretofore. The movement of iron and steel out of warehouse is fairly good, but individual orders generally are for small quantities of material, indicating conservatism on the part of buyers.

Soft steel bars, \$3.26½ base per 100 lb.; flats, \$4.15; concrete bars, \$3.51½ to \$3.64; structural steel, \$3.36½; tire steel, \$4.50 to \$4.75; open-hearth spring steel, \$5 to \$10; crucible spring steel, \$12; steel bands, \$4.01½ to \$5; hoop steel, \$5.50 to \$6; cold rolled steel, \$4.05 to \$4.55; toe calk steel, \$6; refined iron bars, \$3.26½; best refined bars, \$4.60; Wayne, \$5.50; Norway, \$6.60 to \$7.10; plates, ¼-in. and heavier, \$3.36½; No. 10 blue annealed sheets, \$3.91½; galvanized sheets, \$6 base; black sheets, \$5 base.

Coke.—The movement of by-product foundry coke from New England ovens to points of consumption holds up well. Foundries in some instances have allowed fuel supplies to work down to a minimum, consequently are specifying against contracts a little heavier than they ordinarily would. In addition, some plants are increasing their weekly allotments and still others are stocking up for the winter. Both the New

England Coal & Coke Co. and the Providence Gas Co. continue to quote by-product foundry coke at \$11.50 a ton delivered in New England. Some Connellsville and Virginia coke is coming into New England, but such fuels are really not market factors.

Old Material.—During the early part of the past week there was some buying of heavy melting steel at \$12 to \$12.50 a ton on cars for shipment to the Pittsburgh district, of machine shop turnings and rolling mill material at \$9 to \$9.50, and of wrought pipe at as high as \$12.10, but with the filling of orders on hand the market for such materials eased off 50c. a ton. Rails for rerolling also have eased 50c., while shafting and street car rails are about \$1 cheaper. Trading has become dull on the reaction, owners of material being inclined to withhold offerings until prices recover. A little heavy melting steel is moving to eastern Pennsylvania, but on old contracts. Cotton ties are selling at \$8 to \$8.25 on cars, contrasted with \$9 a week ago. The demand for machinery cast, stove plate and railroad malleable is extremely light, and local quotations are largely nominal.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$18.00 to \$18.50
No. 2 machinery cast.....	15.00 to 16.00
Stove plates.....	14.00 to 14.50
Railroad malleable.....	17.00 to 17.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.50 to \$12.00
No. 1 railroad wrought.....	13.00 to 13.50
No. 1 yard wrought.....	12.00 to 12.50
Wrought pipe (1-in. in diam., over 2 ft. long).....	11.50 to 12.00
Machine shop turnings.....	8.50 to 9.00
Cast iron borings, chemical.....	11.00 to 12.00
Cast iron borings, rolling mill.....	8.50 to 9.00
Blast furnace borings and turnings.....	8.50 to 9.00
Forged scrap and bundled skeleton.....	8.50 to 9.00
Shafting.....	17.50 to 18.00
Street car axles.....	17.50 to 18.00
Rails for rolling.....	13.00 to 13.50

Buffalo

Pig Iron Buying of Moderate Tonnage—Finished Material Dull

Pig Iron.—The market is really not so active as it was last week. The total inquiry was about 15,000 tons, including 3000 tons of foundry for a New York State melter, which one local maker converted into business. This maker booked a total of 6000 tons of business for the week. Other inquiries were two for 600 tons, one for 400 tons, one for 500 tons and several for 200 and 300 tons. Some first quarter inquiry is coming out, but makers are not willing to quote any set price on this business. The going price is said to be somewhere around \$19 to \$19.50. The latter price is being quoted by one maker on November and December delivery, and \$20 base on business to be placed over the rest of the month. It is probable that a sizable tonnage for any part of this quarter could be placed somewhere in the district at below \$19.50. Stocks of iron are being trimmed. The Rogers-Brown Iron Co. now has moved all surplus stocks, only normal stocks remaining. Furnace operation throughout the district remains stationary at 11 stacks. The Tonawanda Iron Corporation is now expected to blow in its stack about Nov. 1.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25.....	\$18.50 to \$19.00
No. 1 foundry, sil. 2.75 to 3.25.....	20.00 to 21.00
No. 2 foundry, sil. 2.25 to 2.75.....	19.00 to 19.50
Malleable, sil. up to 2.25.....	19.00 to 19.50
Basic.....	19.00 to 19.50
Lake Superior charcoal.....	22.25

Finished Iron and Steel.—Some hesitancy is noted among finished steel buyers and a period of inactivity is now believed to be on the program for the next month. Prices range about the same, with little difference in quoting by reason of the Pittsburgh plus abolition. Prices being made on bars are about 2.265c., Buffalo, and some Buffalo mills are quoting this price outside the Buffalo districts. General sentiment seems to be crystallizing along the line that the new basing

is going to work out in favor of the leading interest and the largest independent, which have scattered plants. The business in sheets is fair, with 3.40c. to 3.50c. being quoted on black and 4.50c. to 4.60c. on galvanized. Bolt prices are steady with 60 and 10 off on large machine. Makers of reinforcing bars report business much better this month than last month. What business is being placed seems to be given out without much hesitation. Among the bookings of the past week to ten days have been separate lots of 350 tons, 265 tons, 155 tons and 100 tons. Road work is slow and inquiries for mesh are practically nil. The structural fabricating market does not hold much of interest, the best job apparently to be placed during the week being a high school at Seneca Falls, amounting to about 85 or 90 tons.

Steel bars, 3.30c.; iron bars, 3.35c.; reinforcing bars, 3.30c.; structural shapes, 3.40c.; plates, 3.40c.; No. 10 blue sheets, 4.05c.; No. 28 black sheets, 4.75c.; No. 28 galvanized sheets, 5.85c.; bands, 4.05c.; hoops, 4.40c.; cold finished rounds, 4.20c.; cold-finished shapes, 4.70c.

Old Material.—The market is said to be on an even keel and a little stronger than last week. Most of the buying is being done by dealers who have sold to mills within the past two or three weeks. Mills are not buying much at the present time, though one mill is said to have purchased some heavy melting steel during the week at \$17. Another mill would pay \$17 for strictly No. 1 heavy melting steel, but it is difficult to assemble a large tonnage of this material now. Mills will buy heavy melting steel, hydraulic compressed and No. 1 busheling at their own prices. A fairly good demand exists for turnings and borings, but low phosphorus scrap is weak.

We quote f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	\$16.50 to \$17.00
Low phosphorus, 0.04 and under	19.50 to 20.00
No. 1 railroad wrought	15.00 to 15.50
Car wheels	15.50 to 16.00
Machine shop turnings	11.50 to 12.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.50 to 16.00
Grate bars	14.50 to 15.00
Bundled sheets	12.00 to 12.50
Hydraulic compressed	15.50 to 16.50
Railroad malleable	17.00 to 17.50
No. 1 machinery cast	17.00 to 17.50

Birmingham

Pig Iron Buying Confined to Small Lots—Steel Slightly More Active

BIRMINGHAM, ALA., Oct. 21.—Tonnes being sold are in small lots, but the aggregate is satisfactory. Some melters are laying in iron so as to avoid any possible delay because of car shortage. On the other hand, the railroad authorities do not expect any car shortage.

We quote per gross ton, f.o.b. Birmingham district furnace, as follows:

No. 2 foundry, 1.75 to 2.25 sil.	\$17.50 to \$18.50
No. 1 foundry, 2.25 to 2.75 sil.	18.00 to 18.50
Basic	18.50 to 19.00
Charcoal, warm blast	30.00 to 31.00

Steel.—While the steel mill operations in the Birmingham district show no change for the week the Steel Corporation plants going to nearly capacity and the Gulf States Steel Co. 50 per cent in the open-hearth furnace department and more than 80 per cent in the finished department, there is a little better demand, nails and wire in particular moving. New prices on these commodities developed some trade. The perturbed feeling on the change from the Pittsburgh plus price method of price making is still observed in this district, but is quieting down with the prospects for good demand later on. Steel is coming in from the American Bridge Co. for the big open-hearth steel mill and sheet mill being erected here by the Tennessee Coal, Iron & Railroad Co. The plants will be completed during the coming summer, if there are no serious setbacks. Soft steel bars are quoted at 2.05 to 2.15c., Birmingham.

Pipe.—All plants on gas and water cast iron pipe will have need for steady production through the rest of the year. Lettings are reported for more or less tonnage from many directions and shipment is not much, if any, under the make. Both the United States

Cast Iron Pipe & Foundry Co. and the National Cast Iron Pipe Co. are operating their DeLavaud machines on centrifugal pipe while there is considerable cement lined pipe being produced in this district also.

Coke.—No change is noted in the Southern coke market, with independent producers selling their output with hard work. Practically all of the iron and steel interests have considerable coke on hand and one is selling on the open market. Quotations for coke range from \$4.25 to \$5 per ton, the higher price for foundry coke. Foundries are buying coke for immediate needs only.

Old Material.—The old material market in the South is also without change for the week. It is lagging with prices uncertain. No change is made in the list of quotations, heavy melting steel being held at \$12, with but little demand. Some scrap is moving, but the total is not great. The lagging scrap iron and steel market is a consequence of cheap pig iron.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Cast iron borings, chemical	\$15.00 to \$16.00
Heavy melting steel	12.00 to 12.50
Railroad wrought	12.00 to 13.00
Steel axles	17.00 to 18.00
Iron axles	19.00 to 19.50
Steel rails	12.50 to 13.00
No. 1 cast	14.00 to 15.00
Tram car wheels	15.00 to 16.00
Car wheels	14.00 to 15.00
Stove plate	13.50 to 14.00
Machine shop turnings	6.00 to 7.00
Cast iron borings	7.00 to 8.00
Rails for rolling	15.00 to 16.00

St. Louis

Light Demand for Pig Iron—Foundries Are Fairly Busy

ST. LOUIS, Oct. 21.—Foundries which specialize on gray iron and malleable castings report that they are doing a fairly good business. Two such melters in the St. Louis district each bought 500 tons of foundry iron for October and November delivery to take care of orders. These sales brought the bookings of the St. Louis Coke & Iron Co. to 1700 to 2000 tons of foundry iron during the week. Stove foundries report that their business is not so good as it was two weeks ago, but such plants here and in Belleville are fairly busy. These and other melters seem bent on using up their reserve stocks of iron, rather than make any commitments beyond election day. Definite inquiries are mostly for carloads. The market continues firm, with quotations nominal. Northern iron is quoted at \$20.50 to \$21, Chicago; Southern at \$17.50 to \$18.50, and St. Louis Coke & Iron Co. \$21.50 to \$22, Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Florence and Sheffield (rail and water), \$5.17 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	\$22.66 to \$23.16
Northern malleable, sil. 1.75 to 2.25	22.66 to 23.17
Basic	22.66 to 23.16
Southern fdy., sil. 1.75 to 2.25 (rail)	22.67 to 23.67
Southern fdy., sil. 1.75 to 2.25 (rail and water)	20.78 to 21.78
Granite City iron, sil. 1.75 to 2.25	22.31 to 22.81

Finished Iron and Steel.—Sheet steel is reported in better demand, but orders are still confined to carloads and less. Warehouses are doing a fair business in most lines, but their buying is still very conservative. Railroad inquiries are small. Little business is coming from the oil fields.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled one pass, 5c.; cold rolled rounds, shafting and screw stock, 4.15c.; structural rivets, 3.90c.; boiler rivets, 4.10c.; tank rivets, $\frac{3}{4}$ -in. and smaller, 60 per cent off list; machine bolts, 55 and 5 per cent; carriage bolts, 40 and 5 per cent; lag screws, 60 and 5 per cent; hot pressed nuts, squares or hexagons, blank or tapped, \$3.50 off list.

Coke.—Foundry coke is reported in better demand not only in the St. Louis district, but also the South-western territory. The demand for domestic grades is

not so active, warmer weather lessening the desire of dealers to stock up. Connellsville coke, which is in light demand, is quoted at from \$4.50 to \$5.50 at the ovens.

Old Material.—The market for old material is very dull, with prices weaker. A few declines during the week ranged from 50c. to \$1 a ton. Consumers in the district report an improvement in business, but they refuse to buy old material, contenting themselves with drawing on stocks on hand. One purpose of consumers in holding off their purchases is to beat down the price of old material. The reason most given for not buying is that they are waiting until after the election.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Rails for rolling	16.25 to 16.75
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	25.00 to 26.00
Relaying rails, 70 lb. and over	32.50 to 33.50
Cast iron car wheels	15.50 to 16.00
Heavy melting steel	14.50 to 15.00
Heavy shoveling steel	14.50 to 15.00
Frogs, switches and guards cut apart	15.75 to 16.25
Railroad springs	18.00 to 18.50
Heavy axles and tire turnings	12.00 to 12.50
No. 1 locomotive tires	16.00 to 16.50
Per Net Ton	
Steel angle bars	14.50 to 15.00
Steel car axles	19.00 to 19.50
Iron car axles	24.00 to 24.50
Wrought iron bars and transoms	18.25 to 18.75
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	12.75 to 13.25
Cast iron borings	10.50 to 11.00
No. 1 busheling	12.50 to 13.00
No. 1 railroad cast	17.00 to 17.50
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Machine shop turnings	7.00 to 7.50
Champion bundled sheets	8.00 to 8.50

Cincinnati

Pig Iron Market Dull—Northern Furnaces Asking Advance

CINCINNATI, Oct. 21.—The pig iron market continues dull, most orders running from carloads to 200 tons. There were several orders placed for first quarter shipment, including one for 300 tons of Southern at \$17.50, Birmingham. Northern furnaces, however, are asking an advance of 50c. over the fourth quarter price, or \$20.50, Ironton, base. Inquiry is light, the largest being for 1500 tons of malleable for last and first quarter for shipment to Chattanooga. The melt of pig iron in this district is improving slightly and shipments from furnaces are also better than for some time past. No change in the present situation is expected to develop until after election.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Southern fdy., sil. 1.75 to 2.25 (base)	\$21.55 to \$22.05
Southern fdy., sil. 2.25 to 2.75	22.05 to 22.55
Southern Ohio silvery, 8 per cent	31.77
Southern Ohio fdy., sil. 1.75 to 2.25	22.27
Southern Ohio, basic	21.77
Southern Ohio malleable	22.27

Sheets.—The market is quieter than it has been for some weeks. Prices are unchanged, with some of the smaller mills cutting \$2 per ton under the regular market to secure attractive orders. The market is generally quoted at 2.60c. for blue annealed, 3.50c. for black and 4.50c. for galvanized. Tin plate is steady at \$5.50 per base box, Pittsburgh.

Structural Activity.—The week was a blank as far as new building projects or awards were concerned. The U. S. Engineers' Office at Huntington, W. Va., will open bids Nov. 4 for a steel hull for a derrick boat, estimated at 100 tons. The Big Four Railroad will likely award several hundred tons for girder spans and turntables this week.

Reinforcing Bars.—Fair amount of activity is reported. The general contract for the Scioto County (Ohio) Courthouse has been awarded to Taylor & Linn, who will buy 250 tons of bars. E. Latham & Co. have been awarded the general contract for a high school

building at Marietta, involving 250 tons. The Ferro-Concrete Construction Co., Cincinnati, will be in the market for bars for the addition to Hotel Alms, though the tonnage wanted is not specified. Prices of bars are firmer, as the market is generally quoted at 1.95c. mill, for hard steel bars, to 2.10c. for new billet steel. These prices have been shaded \$1 per ton on attractive tonnages.

Warehouse Business.—With a slackening demand for mill shipment, jobbers report an increase in the demand for shipment out of warehouse. Prices, with the exception of wire products, which have been reduced \$3 per ton, are steady.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4.35c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds, 4.05c.; cold-rolled flats, squares and hexagons, 4.55c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.90c.; No. 28 black sheets, 4.60c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, \$3.15 per 100 lb.; common wire nails, \$3.15 per keg base; cement coated nails, \$2.85 per keg.

Finished Materials.—Buying of finished materials slowed down considerably during the past week, though there were no developments of an outstanding nature to account for it. The mixup following the abandonment of the Pittsburgh basing plan is given as the reason for the quietness of the market, and this probably is as good an explanation as has been advanced. There has been little contracting for fourth quarter, buyers committing themselves only for immediate needs, which for the time being apparently are satisfied. The tone of the market is better, however, and an early resumption of buying is looked for. Prices are still inclined to be weak on most of the finished products, but in isolated cases a firmer tendency is noted. On plates and shapes it is now difficult to find a mill to show interest in anything below 1.90c., Pittsburgh, and in the case of shapes most quotations are being made at 2c. The bar market is exceptionally quiet, and while reports are heard of less than 2c., Pittsburgh, being done, most of the orders are still being placed at 2c. to 2.10c. In some sections Pittsburgh district mills are still actively competing with Chicago district mills to their disadvantage, but with Western mills getting into a fairly comfortable position with regard to orders, it is expected that a stiffening in prices will eventually result. In wire products events would indicate that the base prices named at Cleveland and Pittsburgh are being shaded, and for Cincinnati delivery \$2.89 per keg delivered is the ruling price on wire nails. Specialties are not moving in any volume, and prices of track accessories, light rails and forgings are largely nominal.

Coke.—Domestic coke is moving with fair activity, but furnace and foundry grades are still rather quiet. It is reported that some producers of coke will advance prices Nov. 1, due to higher prices being asked for coking coals. Meantime prices are unchanged.

Old Material.—Sentimentally, the old material market is improved, but there has been no buying to speak of, though some inquiries have been sent out. Consumption of scrap is heavier, but mills in this district are working off yard stocks. Prices, largely nominal, are unchanged.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	\$13.00 to \$13.50
Scrap rails for melting	12.00 to 12.50
Short rails	15.00 to 16.50
Relaying rails	28.50 to 29.00
Rails for rolling	14.00 to 14.50
Old car wheels	13.00 to 13.50
No. 1 locomotive tires	14.50 to 15.00
Railroad malleable	14.50 to 15.00
Agricultural malleable	13.00 to 13.50
Loose sheet clippings	9.50 to 10.00
Champion bundled sheets	10.50 to 11.00
Per Net Ton	
Cast iron borings	9.00 to 10.00
Machine shop turnings	8.50 to 9.00
No. 1 machinery cast	17.50 to 18.00
No. 1 railroad cast	15.00 to 15.50
Iron axles	20.50 to 21.00
No. 1 railroad wrought	10.00 to 10.50
Pipes and flues	7.00 to 7.50
No. 1 busheling	9.50 to 10.00
Mixed busheling	7.50 to 8.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Brake shoes	11.00 to 11.50

Cleveland

Increased Inquiry for Bars, but General Hesitancy Still Prevails

CLEVELAND, Oct. 21.—A good volume of inquiry involving a large tonnage of steel, mostly in bars for the first quarter, came from various consuming interests during the week. There is also an inquiry for 10,000 tons of spring steel for delivery during the entire year from an automobile spring manufacturer. An automobile manufacturer is attempting to cover for its spring requirements for the year with a readjustment of prices July 1 and spring manufacturers are attempting to place a similar contract for the spring steel that will be required to fill this order. On the latter inquiry, mills would not name prices beyond Jan. 1 and producers having the first quarter inquiries have not yet decided whether to quote at present for that delivery. Some of these inquiries are taken to mean that prospective purchasers see the possibility of higher prices after election. Some mills report a fair amount of business or about the same volume as in the past few weeks, but others find the market exceedingly dull. There is a great deal of pre-election hesitancy among buyers and orders placed are limited to early requirements. The dullness of the pig iron market is also largely attributed to the uncertainty of the political situation. Automobile manufacturers continue to buy sparingly. Most automobile plants in Detroit are operating close to recent schedules, although the Ford and Dodge companies are reported to have curtailed their output slightly.

Capacities of automobile parts plants are in excess of requirements with the present rate of car production, and keen competition for business is bringing out very low prices from makers of automobile forgings, axles and other parts. The market as a whole continues weak, although there has been very little change in the price situation in the past few days. The American Steel & Wire Co. has advanced screw stock \$1 a ton to 2.75c., Cleveland, which makes the price situation in respect to this product slightly more favorable than it has been to Pittsburgh district mills in getting business in the northern Ohio territory.

Iron Ore.—Consumption of Lake Superior ore during September was 2,927,102 tons, an increase of 291,343 tons over August. Ore in furnace yards and on docks Oct. 1 amounted to 38,997,921 tons as compared with 37,449,846 tons on the same date a year ago. On Sept. 30 there were 149 furnaces in blast using Lake ore, an increase of 22 over Aug. 31.

Semi-Finished Steel.—The market is inactive and lacks firmness. A local mill continues to quote sheet bars at \$37.50 and billets and slabs at \$37, Cleveland. Youngstown mills are quoting slabs and large billets at \$36, but are holding to \$37 at mill for sheet bars and light billets.

Pig Iron.—The current demand is very light and limited to small lots. Most foundries have under contract all the iron they will need this year and not a great deal of interest is being taken in iron for delivery after December. On the other hand, some of the producers have not yet opened their books for next year's delivery, believing that prices will be no lower and may go higher. It is evident that some of the foundries that have bought first quarter iron, or seem willing to buy, are using the same line of reasoning. Most of the sales made by Cleveland interests during the week were by one producer who sold 8000 tons, including one 3000-ton lot, nearly all this being for the first quarter. The same interest has inquiries for 5000 tons, including a 3000-ton lot for the first half. So far no sales are reported beyond the first quarter, although there have been a few other inquiries for the first half. Prices are unchanged but the market is untested. Lake and Valley furnaces quote foundry and malleable iron at \$19.50 to \$20 and these prices are holding in the northern Ohio

territory. For Cleveland delivery local furnaces quote these grades at \$20.50 at furnace. Shipments by most producers are holding up to production.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$19.00
N'th'n No. 2 fdy., sil. 1.75 to 2.25	21.00
Southern fdy., sil. 1.75 to 2.25....	\$23.51 to 24.00
Malleable	21.00
Ohio silvery, 8 per cent.....	31.52
Stand. low phos., Valley furnace..	28.00 to 28.75

Bolts, Nuts and Rivets.—Specifications on fourth quarter contracts for bolts and nuts are fair and prices are firm. As had been expected, the rivet market is gradually settling down to a Cleveland basing point with the same prices as in Pittsburgh, making these two cities and Chicago three established basing points on rivets. The rivet market is weak with some buyers able to get concessions of \$2 a ton from the 2.60c. price. There is also some shading of small rivets.

Steel Bars, Plates and Structural Material.—The price range on steel bars is from 2.09c. to 2.19c., Cleveland, the lower price figuring back to 1.90c., Pittsburgh. While the demand for bars is holding up to the present rate, plate tonnage has fallen off. Plate prices are more inclined to weakness with 1.80c., Pittsburgh, more common than it has been and quotations as low as 1.75c., Pittsburgh, being named in this territory by Eastern mills, although 1.90c. is still the general price. Structural material ranges from 1.90c. to 2c., Pittsburgh.

Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 4.35c.; No. 28 galvanized sheets, 5.45c.; No. 10 blue annealed sheets, 3.45c. to 3.60c.; cold-rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 3.85c.; narrower than 1 in. or lighter than No. 20 gage, 4.35c.; No. 9 annealed wire, \$3.05 per 100 lb.; No. 9 galvanized wire, \$3.50 per 100 lb.; common wire nails, \$3.25 base per 100 lb.

Hot-Rolled Strips.—Wide strip steel is weak and irregular with net prices usually quoted. These when carrying good extras figure down to 2c. to 2.15c., Pittsburgh. The demand is very light. Hoops and bands are steady, the former being quoted at 2.40c., Pittsburgh, and the latter at 2.50c.

Sheets.—New demand is light, the volume not being up to last month. Most mills are holding to 3.50c. for black sheets, 4.60c. for galvanized and 2.60c., Pittsburgh, for blue annealed sheets for shipment in this territory, but are equalizing freight rates when necessary to meet competition. Black sheets are still irregular with quotations of 3.35c. or lower. Ohio mills are generally meeting the Chicago prices for shipments in that territory.

Old Material.—A local mill purchased several hundred tons of heavy melting steel during the week at \$16.50, this being the only buying by consumers reported. Mills in both the Cleveland and Valley districts are out of the market and little activity is looked for until after election day. Car lot purchases of heavy melting steel are being made by Valley district dealers at \$17.25 to \$17.50, but mills would probably have to pay a little more for a lot of any size. However, there is not enough material moving to test prices. Locally heavy melting steel has advanced 25c. a ton and machine shop turnings have declined the same amount.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$15.50 to 15.75
Rails for rolling.....	15.75 to 16.00
Rails under 3 ft.....	17.00 to 17.50
Low phosphorus melting.....	17.75 to 18.00
Cast iron borings.....	13.25 to 13.50
Machine shop turnings	13.00 to 13.25
Mixed borings and short turnings	13.25 to 13.50
Compressed sheet steel.....	13.25 to 13.50
Railroad wrought	13.50 to 13.75
Railroad malleable	17.75 to 18.25
Light bundled sheet stampings...	12.50 to 12.75
Steel axle turnings.....	13.25 to 13.50
No. 1 cast.....	18.50 to 18.75
No. 1 busheling.....	13.00 to 13.25
Drop forge flashings.....	11.25 to 11.50
Railroad grate bars.....	13.25 to 13.50
Stove plate	13.25 to 13.50
Pipes and flues.....	11.00 to 11.50

Reinforcing Bars.—These are in fair demand for lots of 50 tons or less. Rail steel bars are weak owing to

the competition of new billet steel bars being quoted at 1.85c. to 1.90c., Pittsburgh.

Warehouse Business.—The volume of warehouse business shows a fair gain over September. Prices are holding well on all lines.

Coke.—The foundry coke market is quiet, sales being limited to car lots. Prices are unchanged at \$4 to \$5.50 for standard Connellsville brands and \$6.50 Connellsville basis for by-product foundry coke.

Philadelphia

Business Awaits Election—First Quarter Pig Iron About \$1 Higher

PHILADELPHIA, Oct. 21.—In view of the closeness of the Presidential election, business apparently prefers to wait for the result and consequently buyers are still hesitating. However, in some steel lines orders are ahead of those of a similar period in September. Plates show no gains and shapes are probably less in tonnage than last month, which was fairly active in new building projects. Some interest is shown in first quarter pig iron, although both buyers and sellers show hesitancy in making commitments. A sale of 500 tons at \$21.50, base, or \$1 above the current market, shows a seller's view of probable price tendencies. Railroads have contributed to the week's business by fairly large purchases of track accessories.

Pig Iron.—An Eastern furnace, desiring additional tonnage for the fourth quarter, has taken about 15,000 tons at not more than \$20 base, about 6000 tons of this sold to a radiator company being at close to \$19.50, base. Furnaces are not disposed to quote below \$21.50, base, for first quarter iron and about 500 tons was closed at this price. However, neither buyers nor sellers are inclined to commit themselves at this price for the present. On low phosphorus, both copper bearing and copper free, \$24, furnace, is quoted for nearby points, while \$23.50 can be done on shipments to the West taking higher freight rates. A possibility that foreign iron may again become competitive appears in a recent offer from a British seller of low phosphorus iron at a price that permitted the importer to deliver it in the Philadelphia district at a profit, quoting \$26 per ton.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$21.26 to \$22.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.76 to 22.63
East. Pa. No. 1X.	22.26 to 23.13
Virginia No. 2 plain, 1.75 to 2.25 sil.	28.17 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.67 to 29.17
Basic delivered eastern Pa.	20.00 to 21.00
Gray forge	21.00 to 22.00
Malleable	22.00 to 22.50
Standard low phos. (f.o.b. furnace)	23.50 to 24.00
Copper bearing low phos. (f.o.b. furnace)	23.50 to 24.00

Ferroalloys.—There has been little activity in ferromanganese, which is quoted at \$100, seaboard, by British sellers and \$100, furnace, by the leading domestic maker. Spiegeleisen is unchanged at \$31 to \$32, furnace.

Billets.—The market is weak and various reports of low prices render an accurate sounding of the market difficult. While \$36 per ton is quoted for rerolling billets, \$35 has been done on desirable tonnages and apparently this is not the bottom.

Plates.—Quotations are still at 1.60c. to 1.65c., Pittsburgh. Business continues unimproved in volume and mill schedules are on a hand-to-mouth basis.

Bars.—Steel bars are still quoted at 2c., Pittsburgh, or 2.32c., Philadelphia, and the market is steadier in price than shapes or plates. Iron bars are also quoted at 2.32c. per lb., or 2c., Pittsburgh, but there has been no inquiry sufficient to test the stability of this price.

Warehouse Business.—October is developing slightly

more business than September, and prices are holding fairly well on most products. Sheet business, as a rule, has been done at the quoted schedule, but shading is reported on cold-rolled material, which, it is claimed, has been quoted as low as 3.90c. The usual quotation, however, seems to be about 4c. on rounds and 4.50c. on squares and hexagons. The following are quotations for local delivery:

Soft steel bars and small shapes, 3.10c.; iron bars (except bands), 3.10c.; round edge iron, 3.50c.; round edge steel, iron finished, 1 1/4 x 1/4 in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, 1/4 in. and heavier, 3.10c.; tank steel plates, 1/2 in., 3.25c.; blue annealed steel sheets, No. 19 gage, 3.75c.; black sheets, No. 28 gage, 4.75c.; galvanized sheets, No. 28 gage, 5.85c.; square twisted and deformed steel bars, 2.85c.; structural shapes, 3.10c.; diamond pattern plates, 1/4 in., 5.30c.; 1/2 in., 5.50c.; spring steel, 5c.; round cold-rolled steel, 4c. to 4.05c.; squares and hexagons, cold-rolled steel, 4.50c. to 4.55c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.10c.; narrower than 1 in., all gages, 4.60c.; steel bands, No. 12 gage to 1/4 in., inclusive, 3.85c.; rails, 3.10c.; tool steel, 8.50c.; Norway iron, 6.75c.

Structural Material.—Few tonnages were let in the past week. Shapes continue weak with 1.80c. to 1.85c., Pittsburgh, the market, and but little business of note. Bids were opened today by the City of Philadelphia on the contract for construction of the second section of the Broad Street subway, involving about 10,000 tons of steel.

Old Material.—General weakness in practically all grades continues with \$16.50 to \$17 the range on No. 1 heavy melting steel, a tonnage at \$16.50 having been bought by a leading steel company. Machine shop turnings for steel works are quoted at \$13.50 per ton, this being the maximum that two leading consumers are offering at present.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	\$16.50 to \$17.00
Scrap rails	16.50 to 17.00
Steel rails for rolling	18.50
No. 1 low phos., heavy 0.04 and under	21.00 to 21.50
Couplers and knuckles	20.00 to 20.50
Rolled steel wheels	20.00 to 20.50
Cast-iron car wheels	17.50 to 18.00
No. 1 railroad wrought	17.50 to 18.00
No. 1 yard wrought	16.50 to 17.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	12.50 to 14.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	13.50
Machine shop turnings (for rolling mill use)	14.00 to 14.50
Heavy axle turnings (or equivalent)	18.00 to 19.00
Cast borings (for steel works and rolling mills)	14.00
Cast borings (for chemical plants)	16.00 to 16.50
No. 1 cast	17.50 to 18.00
Heavy breakable cast (for steel plants)	16.50
Railroad grate bars	15.00
Stove plate (for steel plant use)	15.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.50 to 17.00
Shafting	24.00 to 25.00
Steel axles	24.00 to 25.00

Imports.—A total of 6730 tons of iron ore was brought in at Philadelphia last week, 6309 tons from Sweden and 421 tons from Spain.

Bookings of Commercial Steel Castings

WASHINGTON, Oct. 21.—Department of Commerce reports from 70 companies, representing about two-thirds of the commercial castings capacity of the United States, showed September bookings of 62,509 net tons, or 62.1 per cent of capacity. Railroad specialties, with 29,567 tons, were 75.6 per cent of capacity, while miscellaneous castings, with 32,942 tons, were 53.5 per cent of capacity. Under both classifications the figures were higher than in August but lower than they were in September, 1923, when the total was 49,401 tons, the railroad specialties being 22,374 tons and the miscellaneous castings 27,027 tons.

The figures for September are the highest since April when the total bookings were 68,119 tons or 67.6 per cent of capacity. This included 33,151 tons of railroad specialties or 84.8 per cent of capacity, and 34,968 tons of miscellaneous castings or 56.8 per cent of capacity.

Freight Rates on Finished Steel from Leading Producing Centers to Various Consuming Points

Rates Per One Hundred Pounds

From Pittsburgh to:

Akron, Ohio	\$0.19
Atlanta, Ga.	0.58
Baltimore	0.31
Beaumont, Tex.	0.705
Birmingham	0.58
Boston	0.365
Buffalo	0.265
Canton, Ohio	0.19
Caspar, Wyo.	1.15
Chattanooga, Tenn.	0.50
Chicago	0.34
Cincinnati	0.29
Cleveland	0.19
Coffeyville, Kan.	0.775
Columbus, Ohio	0.255
Dallas, Tex.	0.885
Denver	1.15
Detroit	0.29
Houston, Tex.	0.89

From Lorain to:

Akron, Ohio	\$0.09
Atlanta, Ga.	0.57
Baltimore	0.37
Beaumont, Tex.	0.655
Birmingham	0.57
Boston	0.43
Buffalo	0.255
Canton, Ohio	0.095
Caspar, Wyo.	1.125
Chattanooga, Tenn.	0.50
Chicago	0.29
Cincinnati	0.265
Cleveland	0.07
Coffeyville, Kan.	0.70
Columbus, Ohio	0.21
Dallas, Tex.	0.84
Denver	1.08
Detroit	0.215

From Cleveland to:

Akron	\$0.09
Atlanta	0.57
Baltimore	0.37
Boston	0.43
Buffalo, rail	0.23
Buffalo, water	0.22
Canton	0.095
Chattanooga	0.50
Chicago	0.30
Cincinnati	0.27
Columbus	0.215
Dayton	0.25
*Denver	1.15

Indianapolis	\$0.31
Jacksonville, Fla. (all rail)	0.70
Kansas City, Mo.	0.735
Memphis, Tenn.	0.56
New Orleans	0.67
New York	0.34
Omaha	0.735
Pacific Coast	1.15
Philadelphia	0.32
St. Louis	0.43
St. Paul	0.60
Shreveport, La.	0.79
Smackover, Ark.	0.52
Toledo, Ohio	0.27
Tulsa, Okla.	0.885
Wichita Falls, Tex.	0.89
Youngstown	0.11

Houston, Tex.	\$0.655
Indianapolis	0.275
Jacksonville, Fla., all rail	0.70
Kansas City, Mo.	0.615
Memphis, Tenn.	0.53
New Orleans	0.65
New York	0.40
Omaha	0.615
Pacific Coast	1.15
Philadelphia	0.38
St. Louis	0.355
St. Paul	0.56
Shreveport, La.	0.76
Smackover, Ark.	0.77
Toledo, Ohio	0.18
Tulsa, Okla.	0.84
Wichita Falls, Tex.	0.84

Detroit, rail	\$0.235
water	0.17
Indianapolis	0.28
Kansas City	0.665
Mansfield	0.95
Massillon	0.95
New York	0.40
Pacific Coast	1.15
Philadelphia	0.38
St. Louis	0.36
St. Paul, rail	0.56
water	0.325
Springfield	0.235

From Chicago to:

Aberdeen, S. D.	\$0.55
Akron, Ohio	0.30
Anderson, Ind.	0.24
Ashland, Ky.	0.32
Atlanta, Ga.	0.67
Baltimore	0.49
Beaumont, Tex.	0.49
Birmingham	0.53
Canton, Ohio	0.31
Caspar, Wyo.	0.835
Chasm, W. Va.	0.34
Chattanooga	0.49
Cincinnati	0.28
Cleveland	0.30
Columbus, Ohio	0.29
Dallas, Tex.	0.69
Dayton, Ohio	0.275
Denver	0.82
Des Moines, Iowa	0.295
Detroit	0.275
Duluth, Minn.	0.305
Evansville, Ind.	0.28
Flint, Mich.	0.29
Fort Wayne, Ind.	0.22
Galveston, Tex.	0.49
Hammond, Ind.	0.025
Houston, Tex.	0.49
Hutchinson, Kan.	0.585
Idaho, common points	1.00
Indianapolis	0.25
Jackson, Miss.	0.53
Kansas City	0.35
Kokomo, Ind.	0.215
Leavenworth, Kan.	0.35
Little Rock, Ark.	0.53
Los Angeles	1.00

From Youngstown to:

Akron	\$0.095
Atlanta	0.58
Baltimore	0.355
Beaumont, Tex.	0.87
Pipe	0.67
Birmingham	0.58
Boston	0.405
Buffalo	0.25
Canton, Ohio	0.095
Caspar, Wyo.	1.15
Chattanooga, Tenn.	0.50
Chicago	0.32
Cincinnati	0.285
Cleveland	0.095
Coffeyville, Kan.	0.87
Pipe	0.74
Columbus, Ohio	0.25
Dallas, Tex.	1.02
Pipe	0.655
Denver	1.13
Pipe	1.14
Detroit	0.265
Houston, Tex.	0.87
Pipe	0.67

Louisville, Ky.	\$0.41
Mansfield, Ohio	0.285
Memphis, Tenn.	0.42
Milwaukee	0.08
Minneapolis	0.275
Mobile, Ala.	0.57
Moline, Ill.	0.175
Montana, com. points	1.00
Morgantown, W. Va.	0.36
Muncie, Ind.	0.25
Muskogee, Okla.	0.60
New Orleans	0.57
Omaha, Neb.	0.35
Peoria, Ill.	0.155
Phoenix, Ariz.	1.00
Portland, Ore.	1.00
Portsmouth, Ohio	0.32
Pueblo, Colo.	0.82
Rawlins, Wyo.	0.90
St. Louis	0.35
St. Paul	0.25
San Francisco	1.00
Shreveport, La.	0.63
Sioux City, Iowa	0.35
Smackover, Ark.	0.60
South Bend, Ind.	0.185
Springfield, Ill.	0.175
Terre Haute, Ind.	0.24
Toledo, Ohio	0.265
Topeka, Kan.	0.435
Torrence, Cal.	1.00
Tulsa, Okla.	0.645
Utah, common points	0.95
Washington, com. pts.	1.00
Wichita, Kan.	0.585
Zanesville, Ohio	0.31

*Applies to minimum carload 40,000 lb. Rate is \$1.11 on minimum carload of 80,000 lb.

San Francisco

Structural Material Active with Numerous Projects in View

SAN FRANCISCO, Oct. 15.—Structural steel is more active than other finished materials. The recent authorization by Governor Richardson of a \$2,000,000 bond issue for the construction of a new State warehouse with steamship piers at this port is a subject of importance to the steel trade in this city. Plans have already been prepared by the Board of State Harbor Commissioners and the warehouse at Third and Channel Streets with the first unit pier at China Basin will require nearly 3000 tons of steel. Another important trade feature of the near future is the \$10,000,000 bond issue just authorized by the city of Oakland for new schools. Six of the new edifices will cost over \$1,000,000 each and the work will commence within a few weeks. This new construction will all be modern reinforced concrete and it will involve over 8000 tons of structural shapes besides a large volume of reinforcing material, practically all of which business will be awarded in this vicinity.

Pig Iron.—Receipts of iron continue and although

there is considerable talk of trade dullness, the cargoes that arrive are readily absorbed. Even though prices are on a low level for this Coast and mills and foundries are not buying as liberally as some sellers think they should, there is a fair volume of trade and really not much cause for complaint. French and Belgian iron is selling well and consumers say the quality has improved during the past year. This fact, coupled with low cost and dependable delivery, makes this iron very popular. Prices remain about the same as two weeks ago, with a little stronger undertone. Scotch and English iron remain fairly steady, with a moderate inquiry in progress. The quoted figures of \$28 to \$29 per ton are not being shaded as much as a little while ago and a small advance is hinted.

Old Material.—Handlers report no change in either market conditions or prices. There is an abundance of material available and likely to be for some time. A goodly portion of material offered is first class heavy melting steel from the several warships now being scrapped on the Oakland side of the bay. Sales are not large, but there is a moderate demand and the price, \$11 per ton, is held fairly steady. There have been some orders from Los Angeles and the sales to that district have been at \$1 less.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)		Lead		Zinc	
	Lake	Electro-lytic*	New York	St. Louis	New York	St. Louis	New York	St. Louis
Oct. 15.....	13.12½	12.87½	49.62½	8.00	7.85	6.65	6.30	
16.....	13.12½	12.87½	49.62½	8.05	7.85	6.65	6.30	
17.....	13.25	12.87½	49.87½	8.10	7.85	6.65	6.30	
18.....	13.25	12.87½		8.10	7.90	6.65	6.30	
20.....	13.25	13.00	51.00	8.25	8.05	6.70	6.35	
21.....	13.25	13.00	51.00	8.25	8.15	6.75	6.40	

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Oct. 21.

Prices for all the metals have advanced during the week. Demand for copper is light, but the market is quite firm. Tin is moderately higher, due largely to the strong London market. Lead is the strongest of the metals and is very scarce at higher prices. The improvement in zinc has been quite marked and quotations in that market also are advancing.

Copper.—Due partly to a steady advance in the London market, but largely to the elimination by sales of some of the cheaper offerings, the electrolytic copper market is decidedly firmer at slightly higher levels than a week ago. The minimum for all producers today is 13.25c., delivered, for October-November delivery, and in some cases the rest of the year, with one or two producers asking 13.37½c. It is generally conceded that forward metal can not be bought at less than 13.25c. A little prompt or October metal from second hands has been sold at a fraction under the market. Domestic demand is light and foreign demand is not heavy. The market is a waiting one, due either to the uncertainty of the political situation or to the fact that fairly heavy buying took place recently, or to both. Lake copper is quoted at 13.25c., delivered.

Tin.—The week has again been a quiet one with total sales not over 400 tons. The most active day was Oct. 16, when 200 tons changed hands at 49.50c. for spot to 49.87½c. for futures. About 150 tons also changed hands on Oct. 18 at a range of 50.12½c. for spot to 50.50c. for futures, but offerings were very few from any source. The transactions here on Saturday are pointed to as the cause of the sharp advance in the London market yesterday. Prices in London today are £250 10s. for spot standard, £252 5s. for future standard and £251 15s. for spot Straits, with the Singapore price yesterday at £252. The London prices today are about £5 per ton higher than a week ago. In this market spot Straits tin was quoted today at 51c., New York, with very little business transacted. Arrivals thus far this month have been 2915 tons, with 4910 tons reported afloat.

Lead.—The market is very strong and demand is very good. Sellers recently have booked large orders. At present, however, the metal is exceedingly scarce and sellers are not ready offerers. Yesterday the leading interest advanced its price from 8c. to 8.25c., New York. In the outside market prices are decidedly firmer, but largely nominal at 8.15c., St. Louis, and 8.25c. to 8.35c., New York, with metal exceedingly hard to obtain at these prices. One cause of the higher prices here is the sharp advance in London where spot metal has gone up over £6 per ton in the last week. Future metal, on the contrary, is almost £2 per ton under these prices. Evidently there is a "squeeze" in spot metal over there.

Zinc.—Here again higher prices in London have had some effect on this market and prime Western for early delivery is quoted today at 6.40c., St. Louis, or 6.75c., New York. There has been fairly good domestic buying and there is a fair amount of business before the market.

Nickel.—Quotations for shot and ingot nickel con-

tinue at 28c. to 30c. per lb., with electrolytic nickel held at 33c.

Antimony.—The market continues strong with Chinese metal in wholesale lots quoted at 11.75c. to 12c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 27c. to 28c., duty paid, delivered.

Old Metals.—The market is stronger and business improved. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible.....	12.75
Copper, heavy and wire.....	11.75
Copper, light and bottoms.....	10.50
Heavy machine composition.....	10.00
Brass, heavy.....	8.00
Brass, light.....	6.50
No. 1 red brass or composition turnings..	8.75
No. 1 yellow rod brass turnings.....	8.00
Lead, heavy.....	7.25
Lead, tea.....	6.00
Zinc.....	4.25
Cast aluminum.....	17.50
Sheet aluminum.....	17.50

Chicago

Oct. 21.—All of the metals have advanced on more active demand. Lead has gone up following an advance today by the leading interest of 25c. per 100 lb. The strength of zinc is predicated on an expected continuation of export demand. Most of the old metals also advanced. We quote in carload lots: Lake copper, 13.50c.; tin, 52c.; lead, 8.05c.; spelter, 6.40c.; antimony, 13.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50c.; copper bottoms, 9c.; red brass, 8.25c.; yellow brass, 6.75c.; lead pipe, 7c.; zinc, 4c.; pewter, No. 1, 25c.; tin foil, 31c.; block tin, 40c.; all buying prices for less than carload lots.

Meeting of Engineering Council's Board

Return to the plan of government reorganization embodied in the Jones-Reavis Bill was decided upon at a meeting of the administrative board of the American Engineering Council, held at the headquarters of the Western Society of Engineers, Chicago, Oct. 17.

The board also voted to send the Interstate Commerce Commission with its approval resolutions submitted by the American Society of Agricultural Engineers regarding wooden sleeping cars, as a result of the death in a railroad accident near Chicago on June 30 of Frederick Walter Ives, president of this society, and other prominent engineers. The resolutions recommend that the Council formally protest to the Interstate Commerce Commission against the further use of wooden Pullman sleeping cars between steel sleepers, and also that the use of wooden sleepers be abandoned as early as feasible.

Appointment of engineer members to the Board of Tax Appeals was urged by the Council's administrative board. The report of the coal storage committee, now available in published form, was finally sanctioned. The Topeka Engineers Club was admitted to membership. The board voted to invite the Founder and other national societies to cooperate in compiling a pamphlet on the compensation of engineers. A committee of from five to seven will be formed to direct the work. Action of the executive secretary, L. W. Wallace, in requesting engineering societies to consider the proposal to form a world federation of engineers was approved.

Wisconsin Steel Works Buys Cranes

CHICAGO, Oct. 21.—The Wisconsin Steel Works, South Chicago, has purchased five cranes for its new blooming mill as follows: One 75-ton, 3-motor 46-ft. span traveling crane and one 50-ton 4-motor 86-ft. span crane with 10-ton auxiliary hoist from Morgan Engineering Co; one 10-ton 3-motor 88-ft. span overhead traveling crane and one 10-ton 3-motor 69-ft. 4-in. span Gantry crane from Whiting Corporation, and one 30-ton 3-motor 48-ft. span overhead traveler from Cleveland Crane & Engineering Co.

Prices of Finished Iron and Steel Products

(Carload Lots)

Tank Plates

F.o.b. Pittsburgh mills, base, per lb.....1.80c. to 1.90c.
F.o.b. Chicago, base, per lb.....2.00c. to 2.10c.

Structural Shapes

F.o.b. Pittsburgh mills, base, per lb.....2.00c.
F.o.b. Chicago, base, per lb.....1.90c. to 2.00c.

Iron and Steel Bars

Soft steel bars f.o.b. P'gh mills, base, per lb.....2.00c.
Soft steel bars f.o.b. Chicago, base, per lb.....2.00c. to 2.10c.
Reinforcing steel bars f.o.b. P'gh mills, base, per lb.....2.00c.
Rail steel bars f.o.b. Chicago district mills, base, per lb.....2.00c.
Common iron bars delivered New York, base, per lb.....2.34c.
Common iron bars f.o.b. Chicago, base, per lb.....2.10c.
Refined iron bars f.o.b. P'gh mills, base, per lb.....2.90c. to 3.00c.
Common iron bars delivered Philadelphia, base, per lb.....2.32c.

Hot-Rolled Flats

(Pittsburgh)

Hoops, base, per lb.....2.50c. to 2.60c.
Bands, base, per lb.....2.40c. to 2.50c.
Strips, base, per lb.....2.25c. to 2.40c.

Cold-Finished Steel

Bars and shafting, f.o.b. P'gh mills, base, per lb.....2.70c.
Bars and shafting f.o.b. Chicago mills, base, per lb.....2.70c.
Bars, Worcester mills, base, per lb.....2.85c.
Shafting, ground, f.o.b. mill, base, per lb.....3.10c.
Screw stock, base, per lb., Cleveland.....2.75c.
Strips, f.o.b. P'gh mills, base, per lb.....4.00c.
Strips, f.o.b. Cleveland mills, base, per lb.....4.00c.
Strips, f.o.b. Chicago mills, base, per lb.....4.30c.
Strips, f.o.b. Worcester mills, base, per lb.....4.15c.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg.....\$2.75
Bright plain wire, base, No. 9 gage, per 100 lb.....2.50
Annealed fence wire, base, per 100 lb.....2.65
Galvanized wire No. 9, base, per 100 lb.....3.10
Galvanized barbed, base, per 100 lb.....3.45
Galvanized staples, base, per keg.....3.45
Painted barbed wire, base, per 100 lb.....3.20
Polished staples, base, per keg.....3.20
Cement coated nails, base, per count keg.....\$2.10 to 2.15
Woven wire fence, base, per net ton to retailers.....\$65.00

Chicago district mill prices are \$2 per ton above the foregoing and Chicago delivered prices are \$3 per ton above the prices f.o.b. Cleveland and Pittsburgh. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mills \$3 a ton higher on products of that plant, and Duluth, Minn., mills \$4 a ton higher.

Bolts and Nuts

(Chicago and Pittsburgh)

Machine bolts, small rolled threads...60 and 20 per cent off list
Machine bolts, all sizes, cut threads...60 and 10 per cent off list
Carriage bolts, smaller and shorter, rolled threads, 60 and 10 per cent off list
Carriage bolts, cut threads, all sizes...60 per cent off list
Hot-pressed nuts, blank or tapped, square...4.50c. off list
Hot-pressed nuts, blank or tapped, hexagons...5c. off list
C.p.c. and t. square or hex. nuts, blank or tapped...4.50c. off list
Eagle carriage bolts...65, 10 and 10 per cent off list
Flow bolts...50, 10 and 5 per cent off list
Semi-finished hex. nuts:
1/2 in. and smaller, U. S. S...80, 10, 10 and 5 per cent off list
1/2 in. and larger, U. S. S...75, 10, 10 and 5 per cent off list
Small sizes, S. A. E...80, 10, 10 and 5 per cent off list
S. A. E., 1/2 in. and larger...80, 10 and 5 per cent off list
Stove bolts in packages...80, 10 and 5 per cent off list
Stove bolts in bulk...80, 10, 5 and 2 1/2 per cent off list
Tire bolts...60 and 10 per cent off list
Bolt ends with hot pressed nuts...60 and 10 per cent off list
Bolt ends with cold pressed nuts...60 and 10 per cent off list
Washers...6.00c. to 6.25c. off list
Lock washers...80 per cent off list

Foregoing prices are quoted f.o.b. Cleveland by Cleveland manufacturers for Cleveland delivery.

Semi-Finished Castellated and Slotted Nuts

(Chicago and Pittsburgh)

(To jobbers and consumers in large quantities)

Per 1000			Per 1000		
	S. A. E.	U. S. S.		S. A. E.	U. S. S.
1/4-in.	\$4.25	\$4.25	1/4-in.	\$13.25	\$13.50
1/2-in.	4.90	4.90	1/2-in.	16.25	16.50
3/4-in.	5.90	6.25	3/4-in.	22.50	23.00
1-in.	7.50	8.50	1-in.	34.00	34.00
1 1/2-in.	9.75	10.00	1 1/2-in.	53.00	55.00

Larger sizes—Prices on application.

Cap and Set Screws

(F.o.b. shipping point.)

Milled hex. cap screws...85 per cent off list
Milled standard set screws, case hardened...85 per cent off list
Milled headless set screws, cut thread...85 per cent off list
Upset hex. head cap screws, U. S. S. thread, 85 and 10 per cent off list
Upset hex. head cap screws, S. A. E. thread, 85 and 10 per cent off list
Milled studs...80 per cent off list

Rivets

Large, f.o.b. P'gh and Cleveland mill, base, per 100 lb...\$2.60
Large, f.o.b. Chicago mills, base, per 100 lb.....2.75
Small, f.o.b. P'gh and Cleveland mills 70, 10 and 5 per cent off list
Small, f.o.b. Chicago mills.....70 and 10 off list

Rails and Track Equipment

(F.o.b. mill)

Rails, standard, per gross ton.....\$43.00
Rails, light, billet, base, per lb.....1.80c. to 1.90c.
Rails, light rail steel, base, per lb.....1.65c. to 1.75c.
Spikes, 1/2 in. and larger, base, per 100 lb.....\$2.70 to \$3.00
Spikes, 1/2 in. and smaller, base, per 100 lb.....3.00
Spikes, boat and barge, base, per 100 lb.....3.00
Track bolts, all sizes, base, per 100 lb.....3.75 to 4.00
Track bolts, heat treated, base, per 100 lb.....4.25 to 4.50
Tie plates, per 100 lb.....2.40 to 2.50
Angle bars, base, per 100 lb.....2.75

Welded Pipe

(f.o.b. Pittsburgh district mills)

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/4	45	19 1/2	1/4 to 1/2	+11	+39
1/2 to 3/4	51	25 1/2	1/2	22	2
1	56	42 1/2	3/4	23	11
1 1/4	60	48 1/2	1 to 1 1/2	30	13
1 1/2 and 2	62	50 1/2			

Lap Weld

2	55	43 1/2	2	23	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	54	41 1/2	7 to 12	26	11
11 and 12	53	40 1/2			

Butt Weld, extra strong, plain ends

1/4	41	24 1/2	2 to 3	61	50 1/2
1/2 to 3/4	47	30 1/2	3/4 to 1 1/2	+11	+54
1	53	42 1/2	1 1/2	21	7
1 1/4	58	47 1/2	2	28	12
1 to 1 1/2	60	49 1/2	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased (on black) by one point, with supplementary discount of 5 per cent and (on galvanized) by 1 1/2 points, with supplementary discount of 5 per cent.

NOTE—The above discounts on steel pipe also apply at Lorain and Youngstown, Ohio, and Wheeling, W. Va. Chicago district mills have a base 2 points less. Chicago delivered base 2 1/2 points less.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel		Charcoal Iron	
2 to 2 1/2 in.	27	1 1/2 in.	+18
2 1/2 to 3 in.	37	1 3/4 to 2 in.	+3
3 in.	40	2 to 2 1/4 in.	2
3 1/4 to 3 1/2 in.	42 1/2	2 1/4 to 3 in.	7
4 to 13 in.	46	3 1/4 to 4 1/2 in.	9

Beyond the above discounts, 4 to 5 fives extra are given on lap welded steel tubes and 3 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	55-58	3 and 3 1/4 in.	36-39
1 1/4 and 1 1/2 in.	47-50	3 1/2 and 3 3/4 in.	37-40
1 1/2 in.	31-34	4 in.	41-44
2 and 2 1/4 in.	22-25	4 1/2 in. and 5 in.	33-37
2 and 2 1/2 in.	32-35		

Hot Rolled

3 and 3 1/4 in.	38-41	4-in.	43-46
3 1/2 in. and 3 3/4 in.	39-42		

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30 base.....87 per cent off list
Carbon 0.30 to 0.40, base.....85 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage	15	2 1/4-in. O.D. 10 gage	30
2-in. O.D. 11 gage	16	3-in. O.D. 7 gage	35
2-in. O.D. 10 gage	17	1 1/2-in. O.D. 9 gage	15
2 1/4-in. O.D. 12 gage	17	5/8-in. O.D. 9 gage	55
2 1/4-in. O.D. 11 gage	18	5/8-in. O.D. 9 gage	57

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....	\$5.65
Old range non-Bessemer, 51½ per cent iron.....	4.90
Mesabi Bessemer, 55 per cent iron.....	5.40
Mesabi non-Bessemer, 51½ per cent iron.....	4.75

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....	9.00c. to 9.50c.
Iron ore, Swedish, average 66 per cent iron.....	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	42c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	40c.
Manganese ore, Brazilian or Indian, nominal.....	42c.
Tungsten ore, high grade, per unit, in 60 per cent concentrates.....	\$8.00 to \$8.50
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard.....	18.50 to 24.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₂ , New York.....	30c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$90.00 to \$100.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid.....	92.50 to 100.00
Ferrosilicon, 50 per cent, delivered.....	70.00 to 75.00
Ferrosilicon, 75 per cent.....	140.00
Ferrotungsten, per lb. contained metal.....	87c. to 90c.
Ferrocromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr, per lb. contained Cr, delivered.....	10.75c.
Ferrocromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr, per lb.....	10.50c.
Ferrovanadium, per lb. contained vanadium.....	\$3.50 to \$4.00
Ferrocobaltititanium, 15 to 18 per cent, per net ton.....	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated.)

Spiegeleisen, domestic, 19 to 21 per cent.....	\$31.00 to \$32.00
Spiegeleisen, domestic, 16 to 19 per cent.....	30.00 to 32.00
Ferrosilicon, Bessemer, 10 per cent, \$39.50; 11 per cent, \$42; 12 per cent, \$44.50; 14 to 16 per cent (electric furnace), \$36.00.	
Silvery iron, 5 per cent, \$27.00; 6 per cent, \$28.00; 7 per cent, \$29.00; 8 per cent, \$30.50; 9 per cent, \$32.50; 10 per cent, \$34.50; 11 per cent, \$37.00; 12 per cent, \$39.50.	

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton, f.o.b. Illinois and Kentucky mines.....	\$18.00
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Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	19.50
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Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per gross ton.....	19.75
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Per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania.....	\$40.00 to \$42.00	\$36.00 to \$40.00
Maryland.....	45.00 to 47.00	40.00 to 43.00
Ohio.....	40.00 to 42.00	37.00 to 39.00
Kentucky.....	42.00 to 43.00	37.00 to 39.00
Illinois.....	—	37.00 to 42.00
Missouri.....	42.00 to 45.00	35.00 to 40.00
Ground fire clay, per net ton.....	6.00 to 7.00	

Silica Brick:	
Pennsylvania.....	33.00
Chicago.....	43.00 to 44.00
Birmingham.....	50.00
Ground silica clay, per net ton.....	7.50 to 8.00

Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00

Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
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Chrome Brick:	
Standard size, per net ton.....	45.00

Sheets

Blue Annealed

(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh dist. mills.....	260c. to 2.70c.
*Nos. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills.....	2.80c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mills.....	3.40c. to 3.50c.
*No. 28 (base) per lb., f.o.b. Chicago dist. mills.....	3.60c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mills.....	4.50c. to 4.60c.
*No. 28 (base) per lb., f.o.b. Chicago dist. mills.....	4.70c.

Tin-Mill Black Plate

No. 28 (base) per lb., f.o.b. Pittsburgh dist. mills.....	3.40c. to 3.50c.
*No. 28 (base) per lb., f.o.b. Chicago dist. mills.....	3.60c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. mill.....	4.60c.
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Long Ternas

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill.....	4.90c.
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*Add 5c. per 100 lb. for delivery in Chicago.

Tin Plate

Standard cokes, per base box f.o.b. Pittsburgh district mills.....	\$5.50
Standard cokes, per base box f.o.b. Chicago district mills.....	5.60
Standard cokes, per base box f.o.b. Elwood, Ind.....	5.60

Terne Plate

(F.o.b. Pittsburgh district mills)
(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base.....	\$11.00	20-lb. coating I. C.....	\$14.90
8-lb. coating I. C.....	11.30	25-lb. coating I. C.....	16.20
12-lb. coating I. C.....	12.70	30-lb. coating I. C.....	17.35
15-lb. coating I. C.....	13.95	35-lb. coating I. C.....	18.35
		40-lb. coating I. C.....	19.35

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$35.50 to \$36.00
Forging billets, ordinary carbons.....	40.50 to 41.00
Sheet bars, Bessemer.....	37.00 to 37.50
Sheet bars, open hearth.....	37.00 to 37.50
Slabs.....	35.50 to 36.00
*Wire rods, common soft, base, No. 5 to ¼-in.....	45.00 to 46.00
Wire rods, common soft, coarser than ¼-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	1.90c. to 2c.
Skelp, sheared, per lb.....	1.90c. to 2c.
Skelp, universal, per lb.....	1.90c. to 2c.

*Chicago mill base is \$48.00.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E. Series Numbers	Bars 100 lb.
2100* (¼% Nickel, 10 to 20 per cent Carbon)...	\$3.00 to \$3.25
2300 (¾% Nickel).....	4.75
2500 (5% Nickel).....	4.00 to 4.50
3100 (Nickel Chromium).....	3.65 to 3.75
3200 (Nickel Chromium).....	5.50 to 5.75
3300 (Nickel Chromium).....	7.25 to 8.00
3400 (Nickel Chromium).....	6.50 to 7.00
5100 (Chromium Steel).....	3.50 to 3.75
5200* (Chromium Steel).....	7.50 to 8.00
6100 (Chromium Vanadium bars).....	4.50
6100 (Chromium Vanadium spring steel).....	4.25 to 4.50
9250 (Silicon Manganese spring steel).....	3.50 to 3.75
Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium).....	4c.
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	4.25 to 4.50
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum).....	4.25 to 4.50
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum).....	3.75 to 4.25
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for cold drawn bars is 1c. to 1½c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

FABRICATED STEEL BUSINESS

Moderate Volume Both in Work Awarded and in the Market for Figures

Awards of structural steel for the week were slightly under 16,000 tons, a low figure as compared with some of the banner weeks of the year, but nevertheless fairly satisfactory for the month of October. New work is coming out in diminishing volume, the total for the week being about 14,000 tons. Awards are:

Loft building for the Wako Co., New York, 600 tons, to Hedden Iron Construction Co.

Lehigh Valley Railroad, bridges totaling 3200 tons, divided between Bethlehem Steel Co. and the McClintic-Marshall Co. National Biscuit Co., manufacturing plant at Los Angeles, 2200 tons, to American Bridge Co.

U. G. I. Contracting Co., building for General Electric Co. at Schenectady, N. Y., 250 tons, to Belmont Iron Works. Pennsylvania Railroad, transfer bridge at Greenville, N. J., 300 tons, to McClintic-Marshall Co.

New York Central Railroad, bridges at Bogota and Teaneck, N. Y., totaling 250 tons, to Shoemaker Bridge Co. and Jones & Laughlin Steel Corporation.

Hotel, Fifty-seventh Street and Sixth Avenue, New York, 900 tons, to Hinkle Iron Works.

Loft, West Thirtieth Street, 450 tons, to Easton Structural Steel Co.

Office building, No. 1 State Street, Boston, 500 tons, to New England Structural Co.

Nurses' Home, Cleveland, 520 tons, to Massillon Bridge & Structural Co.

Capstan Glass Co., Connellsville, Pa., factory building, 400 tons to the Austin Co.

Findley Clay Pot Co., Washington, Pa., factory building, 100 tons to the Austin Co.

Wisconsin Steel Works, blooming mill building and billet yard crane runway, South Chicago, 820 tons, to American Bridge Co.

Bridge over Brazos River, Tex., 650 tons, to Wisconsin Bridge & Iron Co.

Kansas City, Mo., bridge, 1000 tons, to Wisconsin Bridge & Iron Co.

Theater, at Lincoln Avenue and Robey Street, Chicago, 507 tons, to American Bridge Co.

American Smelting & Refining Co., plant, San Luis Potosi, Mex., 820 tons, to Kansas City Structural Steel Co.

Great Northern Railway, bridge work, 500 tons, to Minneapolis Steel & Machinery Co.

Peoples Outfitting Co., Detroit, additional store, 360 tons, to McClintic-Marshall Co.

Peerless Portland Cement Co., Detroit, clay storage building, 185 tons, to McClintic-Marshall Co.

A. E. Staley Mfg. Co., Decatur, Ill., soya bean plant, 150 tons, to Mississippi Valley Structural Steel Co.

Rock Island Lines, one 95 ft. through plate girder span, Trenton, Mo., 146 tons, to American Bridge Co.

Minnesota State bridge No. 4320, 172 tons, to Minneapolis Steel & Machinery Co.

Minnesota State bridges, Nos. 4343, 4345 and 4351, 111 tons, to unnamed fabricator.

Washington Irving junior high school, Des Moines, Iowa, 141 tons, to Pittsburgh-Des Moines Steel Co.

Omar, Mich., State Highway Commission bridge, 150 tons, to Continental Bridge Co.

Bedford Stone Co., Bedford, Ind., addition to plant, 400 tons, to Indiana Bridge Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Loft building, 263 West Thirty-eighth Street, New York, 2500 tons.

Apartment building for Bing & Bing, Grammery Park, New York, 1000 tons.

Gas plant, Hunt's Point, New York, 400 tons.

New York-New Jersey vehicular tunnel, approaches on New Jersey side, 3500 tons.

Baltimore & Ohio Railroad, four grade crossings on Staten Island, New York, 500 tons; two plate girder bridges in Ohio, 200 tons.

N. & G. Taylor Co., additions to plant at Cumberland, Md., 1300 tons.

The Oakdale Contracting Co., New York, was low bidder on two sections of the Brooklyn subways involving about 6000 tons of steel; no award yet.

C. E. Osgood Co., Boston, warehouse, 149 tons.

D. M. Reed Co., Bridgeport, Conn., department store, 320 tons.

Peerless-Portland Cement Co., Detroit, crane runways, 500 tons.

Big Four Railroad, turntable and girder spans, 220 tons, bids being taken.

Garage, Columbus, Ohio, 800 tons, bids asked.

U. S. Engineers' Office, Huntington, W. Va., steel mill hull for derrick boat, 100 tons, bids opened Nov. 4.

Rock Island Lines, four 55-ft. deck plate girder spans, 195 tons.

Elks Home, Camden, N. J., 650 tons.

Pennsylvania Railroad, bascule bridge at Trenton, N. J., 200 tons.

Childs Restaurant, Cleveland, 500 tons, bids taken.

Euclid Avenue Baptist Church and office building, Cleveland, 1000 tons, general contract placed.

Hotel at Madison, Ohio, 200 tons.

Norristown-Penn Trust Co., Norristown, Pa., bank building, general contract awarded to F. V. Warren Co., Philadelphia, steel still pending.

RAILROAD EQUIPMENT BUYING

Chicago & North Western Railroad Enters Market for 3200 Freight and 50 Passenger Cars

The most important activity of the week in the railroad equipment field is the inquiry of the Chicago & North Western Railroad for 3200 freight and 50 passenger cars. Otherwise car business, either placed or in prospect, is unimportant. The New York Central has ordered 15 locomotives.

The Great Northern has ordered 900 automobile box cars from the General American Car Co. and has inquired for 40 air dump cars.

The Mobile & Ohio will probably place orders this week for 200 steel-frame gondolas and 150 steel-frame hopper cars.

The New York, New Haven & Hartford Railroad has ordered from the General Electric Co. and the American Locomotive Co. 7 electric locomotives of a new type.

The Quaker City Tank Line, St. Louis, has ordered 8 tank cars of 6050 gal. capacity from the Standard Tank Car Co.

The New York Central has ordered 15 Pacific type locomotives from the American Locomotive Co.

The Chicago & North Western has entered the market for 1000 box, 1000 automobile, 500 double deck stock, 500 flat and 200 refrigerator cars and 50 passenger cars.

The Burlington is inquiring for prices on rebuilding 1000 gondola cars.

The Texas & Pacific has ordered 10 baggage and express and 3 baggage and mail cars from the American Car & Foundry Co.

STRUCTURAL STEEL SALES

Fabricated Tonnage for September 160,441 Tons for Shops Representing 76 Per Cent of Capacity

WASHINGTON, Oct. 21.—The Department of Commerce announces sales of fabricated structural steel for September, based on figures received from the principal fabricators, as 67 per cent of capacity, with total bookings of 160,441 tons reported by firms with a capacity of 239,315 tons per month. Shipments of firms reporting this item represented 76 per cent of capacity, as against 72 per cent in August.

The statistics are reported by 190 identical firms (including data in earlier months for eight firms out of business), with a present capacity of 245,490 tons per month, comparing with 250,040 in 1923 and 241,715 in 1922. For comparative purposes, the percentage figures are prorated to obtain an estimated total for the United States, based on a capacity of 250,000 tons per month for 1922 and 260,000 tons per month in 1923 and 1924.

Reflecting somewhat irregular employment in the steel plants at Youngstown during the past three months is the decline in aggregate bank deposits of about \$1,500,000 from the June 10 statement. Withdrawals because of intermittent employment and for new construction purposes are attributed by banks as responsible for the decline. The October bank statement shows a gain, however, of \$3,600,000, as compared with the beginning of the year.

PERSONAL

L. G. Pritz, who has been appointed vice-president in charge of all operations in the United Alloy Steel Corporation, Canton, as announced last week, is one of the oldest electric furnace men in the United States, although still a comparatively young man. He has had a broad experience in steel making, which started in 1909 at the South Chicago plant of the Illinois Steel Co., where he served in turn as foreman, melter, superintendent of electric furnace and superintendent of special high grade steels. Resigning as metallurgical engineer in charge of the high grade specialty and alloy department of that company, he became associated in 1917 with the Timken Roller Bearing Co. and for five years was general superintendent of that company's steel works, having charge of the electric furnaces, rolling mills and tube plant, producing steel for roller bearings. In 1922 he became associated with the Sizer Steel Corporation, Buffalo, as vice-president, specializing in the production of various special and alloy steels for automotive parts.



L. G. PRITZ

J. G. Bell, who has been connected with the main office of the United Alloy Steel Corporation, Canton, Ohio, as sales and metallurgical engineer, has been transferred to the company's New York office, 1626 Pershing Square Building, taking the place of E. M. Littell, who recently resigned.

S. O. Otrich, formerly managing engineer of the Industrial Drive & Equipment Co., is now associated with the A. H. Coates Co., 615 Howard Street, San Francisco. Mr. Otrich recently returned from an extended trip throughout the Pacific Coast for the purpose of studying power transmission conditions. He expects promising developments for manufacturing operations on the coast during 1925.

Lewis W. Hicks, vice-president Penn Iron & Steel Co., Creighton, Pa., has been elected president of the company, succeeding the late George T. Lewis.

F. C. Hesck has been appointed secretary-treasurer of the Titusville Forge Co., Titusville, Pa., succeeding F. R. Whitecomb, resigned.

F. W. Prince, for a number of years associated with the Worthington Pump Co. and the American Brake Shoe & Foundry Co., is now connected with Freyn, Brassert & Co., Chicago, in charge of the firm's department of foundry construction and engineering. Freyn, Brassert & Co. have devoted themselves heretofore to iron, steel and power fields and have recently extended their operations to foundry consulting and construction work.

Leroy R. Vernon, for many years with the American Machine Mfg. Co., Atlanta, Ga., has been appointed general superintendent of the Star Foundry & Machine Co., Sharon, Pa., manufacturer of gray iron castings.

Director Dr. Waldschmidt and Dipl. Ing. Sauter of Ludwig Loewe & Co., Berlin, Germany, are now in the United States reestablishing relations with firms in this country which at one time were customers of the German firm.

Lawrence M. Brile, who has been connected with aluminum smelting companies for the last 15 years, in the sale of aluminum ingots, has become associated

with the National Smelting Co., Cleveland, where he will make his headquarters.

A. E. Hageboeck, an active worker in the American Foundrymen's Association, who recently was elected to its board of directors, is secretary-treasurer of the Frank Foundries Corporation, Moline, Ill. After graduation from the University of Iowa in 1907, he spent five years with the U. S. Engineers Corps as inspector in charge of boat and barge construction. During this time he developed a testing laboratory. He had charge of the Birmingham plant of the F. J. Lewis Mfg. Co. for three years and in 1915 purchased an interest in the Frank Foundries Corporation. Mr. Hageboeck has taken a deep interest in the work of the American Foundrymen's Association and was largely responsible for the organization of the Quad City Foundrymen's Association, of which he was the first president.



A. E. HAGEBOECK

Waldemar Dyrssen has been appointed chief engineer of the furnace equipment department and the forge and hammer welding department of the Blaw-Knox Co., Blawknex, Pa. He is a graduate of the Royal Technical University, Stockholm, Sweden, with the degree of metallurgical engineer. In 1909 he became designing engineer in the department of construction for Les Petits Fils de Francois de Wendel et Cie, in Lorraine. For two years he was with the Uddeholm Co., Sweden, as blast furnace and open-hearth superintendent, then for two years with the Bethlehem Steel Co., Bethlehem, Pa., as designing engineer in the department of construction. Since December, 1915, Mr. Dyrssen has been with the United States Steel Corporation as metallurgical engineer, having taken part in the development of the Heroult electric furnace under the late W. R. Walker and J. H. Gray.

A. J. Romer has resigned as chief engineer of the Romer Motors Corporation, Taunton, Mass., and will establish himself in New York as consulting engineer, specializing on automotive products and automatic production conveyor systems.

H. A. Waldrich, of Siegen, Germany, builder of heavy machinery, sailed for home after a stay of several weeks in this country during which he visited many large machine tool factories and steel plants.

Standard Specifications on Scrap

Efforts looking to standard specifications on scrap have been resumed by the iron and steel committee of the National Association of Purchasing Agents. The committee met on Oct. 17 at the offices of the National Malleable & Steel Castings Co., Cleveland. It was agreed to add to the existing standards sections on hydraulically compressed definned scrap and scrap for rerolling rails. When these have been added, the standards will be submitted to the executive committee of the National Association for approval. Following the executive committee's formal approval, the standards will be submitted to a conference of representatives from all branches of the scrap trade to be sponsored by the U. S. Bureau of Standards.

The Bromwell Brush & Wire Co., Greensburg, Ind., has resumed operations at its plant after a shut down for the past 90 days. It is purposed to add to the working force gradually until the regular production schedule is developed.

OBITUARY

Henry R. Towne

Henry Robinson Towne, past president of the American Society of Mechanical Engineers and of the Merchants' Association of New York, chairman of the Yale & Towne Mfg. Co., a leader in industry and valued citizen, died at his home in New York Oct. 15, aged 80 years.

Mr. Towne was born in Philadelphia in 1844, the son of John H. Towne, who was a partner in the firm of I. P. Morris, Towne & Co., owners of the Port Richmond Iron Works. His academic course completed, he entered the University of Pennsylvania. Only his first college year was completed when the Civil War caused him to shift the scene of study to the drafting room of the Port Richmond Iron Works. In 1863 he was given charge of Government work in repairing the gunboat Massachusetts. Later, at the age of 20, he was sent to Charleston, S. C., to assemble engines in Union ships.



HENRY R. TOWNE

With the restoration of peace, Mr. Towne became an earnest student under the guidance of Robert Briggs, whom he accompanied on an engineering tour in Europe. Before returning home, he took a special course in physics at Sorbonne University in Paris. The "Morton Memorial," published in 1905 by Stevens Institute of Technology, of which Mr. Towne was a trustee, states that during this period he conducted numerous experiments in leather belting, with results which were accepted as standard for 20 years.

In the summer of 1868 Mr. Towne and Linus Yale formed the partnership which became the Yale & Towne Mfg. Co., with plant at Stamford, Conn. The death of Mr. Yale three months later left a legacy of new ideas in lock design. These were greatly amplified by Mr. Towne, as were methods of production, many of which have become accepted standards. Besides the training of a mechanical engineer, which soon displaced crude processes with rapid machine tools and efficient processes, Mr. Towne brought to the company a talent for

organization. As its president from 1868 to 1915, when he became chairman, he saw it grow to reach a daily output of 25,000 locks.

But his effort was not confined to his shop. Appreciating the menace of trade wars, long waged in hardware manufacture, to the damage of all concerned, he devoted much time to make competitive relations more cordial. He was a pioneer in plant sanitation improvements. In another field, he was an early and active member of the Merchants' Association of New York, where he made his home after 1892. From 1907 to 1913 he was president of the association and was a director at the time of his death. In a larger field, he was a factor in urging the organization of the Chamber of Commerce of the United States, also of the National Tariff Commission. He was active in the early affairs of the League for Industrial Rights, the National Industrial Conference Board and similar bodies formed to stimulate commercial development. He was a charter member of the Engineers' Club, New York.

Mr. Towne was an early member of the American Society of Mechanical Engineers. For a long time he was prominent in its activities and was its president in 1888-89. His contributions to technical literature have shown a scholarly mind and a clear perception of the relations of theory and practice. He was the author of "Locks and Builders' Hardware" and "Towne on Cranes." In recognition of his manifold services to his country, as well as of executive ability of a high order, he was named one of the first directors of the Federal Reserve Bank of New York. A son, John H. Towne, is a director of the Yale & Towne Mfg. Co.

WALTER M. BACON, president American Tool & Machine Co., Boston, for whom funeral services were held on Oct. 16 at his home in Dorchester, Mass., died on Oct. 12. He was a native of West Newton. Mr. Bacon became president of the American Tool & Machine Co. in 1894.

JOHN E. POTTER, formerly president of the National Aluminum Works, Elmira, N. Y., but for the last few years retired, died at the Masonic Home, Utica, N. Y., Oct. 11, following a prolonged illness.

CARL L. MELLIN, consulting engineer of the American Locomotive Co., a designer of numerous locomotive devices and improvements, died at his home in Schenectady, N. Y., on Oct. 15.

PATRICK BERNARD DELANEY, inventor of many major devices and for 50 years associated with Thomas A. Edison, died at his home in South Orange, N. J., on Oct. 18, aged 80 years. Mr. Delaney was at one time vice-president of the American Institute of Electrical Engineers.

American Imports of Cast Iron Pipe from Belgium and France

The fact that imports of "tubular products" to the United States in August were 4339 tons, while the total for the first eight months of this year was 39,596 tons, has attracted the attention of manufacturers of pipe. Inquiry by THE IRON AGE has led to an analysis of the figures by the Bureau of Foreign and Domestic Commerce at Washington, and the bureau has furnished the following statement showing the character of the imports and the countries of origin:

Imports of Pipe and Tubular Products Into the United States for the First Eight Months of 1924

Cast iron pipe from:	Gross Tons
Belgium	18,111
France	15,047
United Kingdom	1,268
Canada	38
All other countries.....	2,147
Total	36,611
Cylindrical or tubular tanks or vessels for holding gas, etc., from:	Gross Tons
Belgium	53
France	155
United Kingdom	297
Canada	37
All other countries.....	1,112
Total	1,654
Other pipe and tubular products.....	1,331
Total all tubular products.....	39,596

The districts into which the imports of tubular products came are indicated in the table below:

Cast iron pipe imported into:	Gross Tons
Maine and New Hampshire.....	1,100
New York	612
Philadelphia	146
Los Angeles	17,470
San Francisco.....	1,394
Porto Rico	13,346
All other districts	2,543
Total	36,611
Cylindrical or tubular tanks or vessels for holding gas, etc., imported into:	Gross Tons
New York	564
Philadelphia	226
San Francisco	81
All other districts.....	783
Total	1,654
Other miscellaneous tubular products...	1,331
Total pipe and tubular products	39,596

It will be seen that the imports of tubular products have consisted almost entirely of cast iron pipe. The principal shipments were made to California and Porto Rico, those going to California being of large diameter pipe used in pen stock construction. Belgian and French foundries furnished most of this pipe, the shipments from France coming from the well-known Pont-a-Mousson works.

New Molding Machines Feature Exhibition

(Concluded from page 1064)

ment by a large number of leading manufacturers. This included cranes, trolleys, hoists, monorail tracks, buckets, electric trucks and tractors in lift and other types, as well as cupola charging hoists previously referred to. Among the new exhibits in this field was an air operated bucket shown by the Whiting Corporation.

A new automatic device for oscillating brass and aluminum melting furnaces was exhibited by the Monarch Engineering & Mfg. Co., Baltimore. This device can be belt or electrically driven.

Electric Furnaces

The Pittsburgh Electric Furnace Corporation, Pittsburgh, had in its booth a one-ton 'Lectromelt furnace and various grades of castings obtainable from this furnace. On a bulletin board the names of the companies in Milwaukee which have this furnace installed were given as follows: Bucyrus Co., Crucible Steel Castings Co., Cutler-Hammer Mfg. Co., Gerlinger Electric Steel Castings Co., Maynard Electric Steel Castings Co., Milwaukee Vocational Schools, Sivyer Steel Castings Co., George H. Smith Steel Castings Co., the Stovall Co., Wehr Steel Co. and A. D. Smith Corporation.

William Swindell & Brothers displayed one of its electric melting furnaces which was under operation in all respects except melting. There was also displayed in its booth some pictures of electric heat-treating furnaces.

The Detroit Electric Furnace Co., Detroit, had in partial operation one of its small rocking furnaces.

The Ajax Metal Co., Philadelphia, displayed one of its Ajax-Wyatt furnaces on which was a notice that almost 400 are now in use. Many of the products of the Ajax Metal Co. and of the Ajax-Wyatt furnace were on display in attractive surroundings.

Other companies exhibiting electric apparatus used in a foundry were the Electric Furnace Co., Salem, Ohio, the Electric Heating Apparatus Co., Newark, N. J., and Holcroft & Co., Detroit.

Miscellaneous Exhibits

The Ruemelin Mfg. Co., Minneapolis, exhibited a counterbalanced roller curtain for use on sand blast rooms. The curtain permits sand blasting at right angles over the entire face of a casting. The sight screens and a slitted rubber vent for the sand blast hose are moved up and down at will to give the operator the best possible position for observing the work and for directing the blast. A zigzag sand sifter for removing dust from blasting sand was also shown. Zigzag troughs over a screen change the direction of the sand, turn it over and thereby more effectively remove the dust from it.

The Steel Products Mfg. Co., 4611 West Roosevelt Road, Chicago, displayed a tubular link flexible shaft for transmitting power to grinders and other tools. It is recommended particularly for grinding irregular castings.

A vertical drier for drying coal was shown by the Fuller-Lehigh Co., Fullerton, Pa. The drier is of hopper type, the green coal entering the top and gradually traveling toward the bottom. In its passage it takes a zigzag course, being deflected by a network of horizontal gas ducts. Drying is accomplished both by conduction of heat through the walls of the gas ducts and by direct contact between the gases and the coal, as the gases pass from the inlet to the outlet openings. This type of drier has been used successfully for years for drying wheat and corn.

The Chicago Crucible Co., Chicago, Ill., brought to public attention for the first time an alloy for use in cupola iron mixtures for which many claims are made, involving particularly an improvement in the strength and quality of gray iron castings. The name of the alloy is "Cupalloy," some of the ingredients of which include nickel, chromium, manganese and aluminum, in varying proportions to suit different operating

conditions, all bound together in the form of a briquette.

The Dock & Mill Co., North Tonawanda, N. Y., had in its booth a very large log of wood to illustrate its method of cutting up timber for incorporation in patterns, flasks and templates.

The Lauden Machinery Co., Fairfield, Iowa, had an impressive display of many of its products, particularly its high-speed chain hoists EveReady electric hoists.

The Monarch Engineering and Mfg. Company, Baltimore, Md., offered an assortment of melting furnaces, core ovens and sand mixtures, some of them of original size.

The S. Obermayer Co., Chicago, prepared an exceedingly attractive booth because of its golden anniversary exhibit. A new departure as a substitute for the foundry nail was featured.

The booth of Pickands, Brown & Co., Chicago, producers of solvay foundry coke, had as a background a reproduction of one side of an office built of coke with a large blast furnace and coke oven plant visible in the distance.

Rogers, Brown & Co., besides their usual display, announced their agency for the Niagara Smelting & Refining Co., and had on exhibition aluminum, brass and other products of that company.

The Sterling Wheelbarrow Co., Milwaukee, featured in a large booth some of its new steel flasks.

McMyler Interstate Co. Acquires Turntable Department of King Bridge Co.

The railroad turntable department of the King Bridge Co. has been acquired by the McMyler-Interstate Co., Bedford, Ohio.

Patterns, drawings, sales records and other material and records taken over from the King Bridge Co. will be maintained by the McMyler-Interstate Co., in order that railroad systems and industrial plants now operating King bridge turntables may obtain repairs and spare parts quickly and without inconvenience.

The McMyler-Interstate Co. has built special railroad equipment such as car dumpers, pile drivers and locomotive cranes for many years, and its service to railroads will be supplemented by a new turntable and transfer table department.

Reeves Brothers Company's New Fabricating Plant at Birmingham, Ala.

BIRMINGHAM, ALA., Oct. 21.—A steel fabricating plant, manufacturing in particular tanks, concrete mixers and kindred products, consuming upwards of 5000 tons of steel monthly and giving employment to about 200 men, will be built here at once by the Reeves Brothers Co., Alliance, Ohio. A site of 40 acres has been purchased from the J. L. Yancey Real Estate & Insurance Co. for \$30,000 and machinery is being shipped from Alliance. Structural steel will be shipped by the McClintic-Marshall Co. The plant will be up within six or seven months. Several locations were investigated and the Birmingham decided upon as the best available. Work will be started at once on the construction. The site and plant will represent an outlay of \$1,000,000.

Right to Employ Non-Union Labor Is Upheld

The right of a contractor to employ non-union labor where there is no specific agreement to the contrary was upheld by the District Court of Appeals, San Francisco, Oct. 16, in the case of the Steel Tank & Pipe Co. of California against the Pacific Fire Extinguisher Co. On the alleged suggestion of the architect of a building in Fresno, Cal., the defendant prevented the plaintiff from erecting a large tank on the roof of the building because the plaintiff employed non-union labor. The tank company was given judgment for \$1,380, the contract price of the work and materials. The judgment was affirmed by the appeal court.

Foundrymen Discuss 65 Papers and Reports

(Continued from page 1059)

due to the fact that part of the overhead is fixed and continues regardless of the change in the volume of production. If a non-profitable line is continued for these or any other reasons, it is of the greatest importance to the foundryman to know just how far he can maintain the policy.

Discussion

In comparing the two papers, H. A. Neel, Michigan Steel Castings Co., Detroit, pointed out that they approached the problem from different angles. It was Mr. Corbett's purpose to ascertain definitely the cost of individual castings, while the idea emphasized in Mr. May's paper is properly to distribute departmental costs. In commenting on the reasons presented in Mr. May's paper for the retention of unprofitable lines, Mr. Neel stated that the financial graveyards are full of those who went a little too far in carrying unprofitable work. Sales departments, in his opinion, should make up their minds to give up lines which do not yield a profit. It is overcharging the buyer who gives one profitable work to make him pay a price which will enable the foundry to continue unprofitable operations. Each job should stand on its own feet.

Committee Reports

W. B. Greenlee, Greenlee Foundry Co., Chicago, read the report of the Committee on Costs, of which he is chairman. It was stated that conditions among foundries vary so greatly that it is impossible to devise a uniform cost system adaptable to all. It was decided, therefore, to formulate general principles to be used as a guide in devising cost-finding methods. They are as follows:

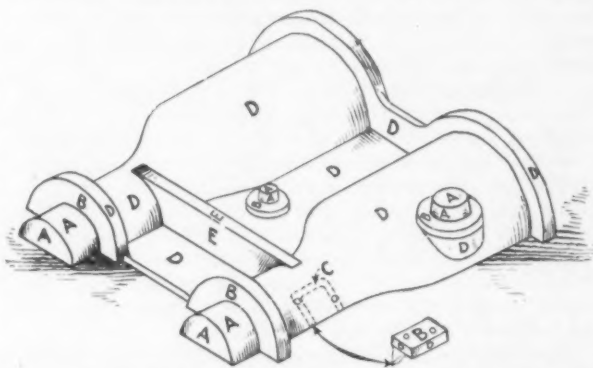
1. Costs should be determined for pounds of good castings produced during stated periods (usually monthly) for individual castings, classes, customers or the foundry as a whole as conditions may require.
2. Cost factors should be distributed departmentally so far as practicable.
3. In figuring costs of individual castings, classes or customers, certain expenses should be applied specifically. The expenses which cannot be charged directly should be applied partly on the basis of direct labor and partly on the basis of a uniform cost per pound of good castings produced.
4. Costs should be kept according to the way sales quotations are made, that is, either by individual castings, classes or customers. This will make it possible to compare costs with selling prices.
5. Costs should include all expenses incident to the manufacture of castings, including interest, depreciation and reserves.
6. Cost estimates prepared for the purpose of determining sales quotations should be based upon normal operation and current market prices. Normal operation means that percentage of full operation which will represent average business taking into account class of work and facilities. This percentage

will be somewhere between minimum and maximum and should never be considered the maximum. The purpose of figuring normal costs at all times is to absorb during periods of good business the idle expense incurred during periods of low production.

7. In making cost estimates for the purpose of sales quotations consideration should be given to the yield or the percentage of good production to the metal charged. It is believed the importance of yield as a cost factor is not generally recognized by the foundry industry.

Pattern Standardization

A report on Pattern Standardization was read by E. S. Carman, Osborn Molding Machine Co., Cleveland, as general chairman of a joint committee of the American Foundrymen's Association, the American Society for Testing Materials, the American Society of Mechanical Engineers, the American Malleable Casting



Proposed Standard Color Markings for Patterns as Shown in Cope Half of a Pattern. A represents core prints and seats for loose core prints and is yellow; B, machined surfaces (red); C, seats for loose pieces (red stripes or yellow base); D, surfaces to be left unfinished (black); and E, stop-offs (yellow base with diagonal black stripes)

Association, the Foundry Equipment Manufacturers' Association, the National Association of Pattern Manufacturers, the National Association of Purchasing Agents and the Steel Founders Society. He announced that standard coloring for patterns and core boxes has been adopted and that progress is being made on the standardization of pattern mounts and flasks. The standard colors are as follows:

Surfaces to be left unfinished are painted black; surfaces to be machined, red; seats of and for loose pieces, red stripes on a yellow background; core prints and seats for loose core prints, yellow; stop-offs, diagonal black stripes on a yellow base.

The standardization of flasks, he said, will save the foundry industry millions of dollars now tied up in idle equipment. In fact, one representative foundryman is of the opinion that the scrap value of the flasks at his plant would be sufficient to bear the cost of an entire new set of the proposed standard flasks.

Apprentice Training and the Milwaukee System

CHAIRMAN Harold S. Falk of the Falk Corporation, Milwaukee, opened the session on apprentice training with a few words on the importance of the subject to the industries of the country. He introduced Mr. Hartley of Nebraska, the newly appointed director of vocational training work for the National Founders' Association, who discussed the present importance of industrial educational effort in view of the recent immigration legislation which will keep out the supply of skilled mechanics, which the country relied upon formerly, for at least the next 10 years. Mr. Hartley predicted that unless the United States taught the youth of the country the skill necessary to produce manufactured products, Europe will outdo us and we will naturally sink to the level of a second rate power.

The paper on "The Employer's Expectation of Apprenticeship," by R. J. Doty, Sivyer Steel Casting Co.,

Milwaukee, was then read by Mr. Frommelt. It was brought out that employers required an adequate supply of apprentices, and that this was best undertaken by districts. The course of study laid out should be such that it became, in effect, a general industrial education. This had been done in Milwaukee with such signal success that many young men thus trained now occupy executive positions in the foundries and other local industries. Understudies are required for all the important posts of an industrial establishment, and hence apprentices should be shifted about the shop in such a way that they get a good insight into operations involved and thus are ready for emergency service as may be required. Apprenticeship courses must be flexible to give the greatest value. Well-trained apprentices will be found cheap when the cost of the useful men of an organization is computed. A district apprenticeship

program is necessary for any region or industrial center. A local system cannot master the program. The supply will not be sufficient. When handled right the labor turnover will be largely decreased, the constant aim being to foster a strong spirit of loyalty. Apprenticeship systems should not cover up deficient wages and poor working conditions, and should be laid out on the best of educational and remunerative lines.

The Milwaukee System

Mr. Falk now turned the chair over to William Watson, Allis-Chalmers Co. Mr. Falk then presented his paper on the Milwaukee district program of industrial education. From small beginnings the Metal Trades Association of the city has developed its work until in 1924 there are 1000 apprentices cared for of whom 250 are in the several foundries interested. Many of the smaller industries have now joined in the work and the apprenticeship committee of the Metal Trades Association now has available the necessary funds for effective action. The diversity of requirements makes the problem a difficult one.

The Milwaukee plan invites conveniently located plants to form a group, so that large and small plants can interchange forces where part-time vocational instruction makes this desirable. The law makes such instruction compulsory, and it works out in such a way that apprentices get full time in vocational schools in alternate batches. The results are good, the apprentices stick and the foremen are relieved of the work of breaking in the young men, this now being the task of expert teachers. Young men now request the chance to take foundry apprenticeship courses. Not only this, but as Milwaukee citizens see the value of the system—particularly for the foundry—parents now ask for this training for their sons.

Discussion

In opening the discussion Mr. Falk introduced R. L. Cooley, director Milwaukee Vocational School System, to explain the methods of instruction, which he did at some length. There are two ways to train the youth of today for their future work in industries. One way is via the trade school, which Mr. Cooley praised as very excellent but entirely inadequate for the needs of the case. The other way is on the "learn as you earn" basis of apprenticeship instruction. The second way is the right one, as it alone can care for the vast number of young people preparing to enter life along industrial lines. It is necessary, however, to put "system" into such training, so that they have more than just "jobs." Mr. Cooley also stressed the commercial aspect of vocational training. Well-trained workmen become good buyers for the products made by industry, as contrasted with the unskilled laborers who live on low levels.

The standpoint of the apprentice himself was next ventilated. The first speaker was J. Edwards, a young man who had gone through the Milwaukee system of apprentice training. He gave an impromptu talk on how the apprentice had been treated from the early to the modern phases of industrial development, and how the apprentice would feel as a human being toward his preceptors. He dwelt upon the necessity of large-scale training facilities, urged greater publicity of the fact that this training can be had; asked apprenticeship contracts be held as flexible as might be consistent with sound discipline, and that competition among apprentices be encouraged for the betterment and enlivenment of all. It was necessary in all cases that the immediate superiors, such as the foremen, be thoroughly sold up on apprenticeship training, and that the apprentices themselves help by cooperation with the various types of men in the shops, from all of whom some good could be learned.

Why I Talk Apprenticeship

C. Freund of Milwaukee followed with an enthusiastic argument of "Why I Talk Apprenticeship." He outlined how in his youth he had tried to learn, giving up job after job when he found himself used as a machine. The discouragements he had gone through were

held up to show what should be avoided if it is expected that apprentices shall like their work. Finally, coming to Milwaukee, he got into the right hands and then advanced rapidly and really learned his work as it should be known.

Gratitude for learning while an apprentice makes Mr. Freund talk apprenticeship everywhere and on all occasions, and he is doing splendid work helping young men find their posts in life. Organization and system are necessary to get results. Instruction must be laid out. The regular curriculum of the schools is held out as a good example of this, for every study has its time and place and is definitely provided for. So also with apprentices. Work must be laid out and timed to accustom the young man to discipline and getting results. Not until work is respected as such will parents want to send their children into it instead of making it easier for them than they had it themselves. But with the opportunities brought by industrial education for a solid existence and successful life ahead, parents will act differently.

Discussion

In the discussion that followed the reading of all the papers Dr. Moldenke commented on the statement of Mr. Hartley that the immigration laws would endanger our industrial standing unless we trained more skilled mechanics. Observation in Paris and Hamburg last year, at the national conventions of the foundrymen involved, indicated that special efforts were being made to increase the supply of trained apprentices in France and Germany. Since few of these young men would be allowed to enter this country, there would be a potential danger to our industries involved unless we do likewise.

A. E. McClintock, commissioner National Foundrymen's Association, discussing the situation he had observed in Milwaukee, was specially impressed by the high type of boys he had seen, the excellent arrangement of courses of instruction offered, and the high inducements given for taking up apprenticeship courses.

Dean Connolly of the Carnegie Technical Schools expressed the hope that the Milwaukee idea would soon come east of Chicago, where the wholehearted cooperation of citizens, school boards and industrial interests was not as noticeable as was the case in Wisconsin and other mid-western States. He quoted the hard struggle of the Carnegie Technical Schools to get the friendship of those whom it was intended to benefit. This was now had, however, and splendid work was being done. Dean Connolly urged that foundrymen work with their regional boards of education toward the establishment of vocational schools, since it was but just that tax money now going into high school development—for the boys who were usually of families able to pay for this education—be, to a large extent, diverted to schools for the masses of boys unable to get their training otherwise. The governmental opportunity for educational help given dollar for dollar as spent by the States was also discussed by both Dean Connolly and Director Cooley, the advantages and limitations of this aid being pointed out.

F. W. Kirby, Moline, Ill.—the district of the Quad City Foundrymen's Association—described how the industries of that region had been benefited educationally by the appointment of a regional "supervisor of apprenticeship," as the result of the efforts of 27 industries in the four cities interested.

One of the Chicago foundrymen present, from Elmhurst, a suburb, inquired about the chance for this work in smaller towns. In their region the apprentices were called "Student Mechanics." Director Cooley responded to this, showing how 52 cities in Wisconsin had developed vocational schools. The secret of success, he pointed out, was in specifically appropriating funds for this purpose instead of letting the vocational school take a chance out of the general educational funds. In Wisconsin the appropriation was one and one-half mills of the total assessed value of the region involved. Milwaukee and 51 other cities were taking advantage of this law.

W. D. Moore, president of the American Cast Iron Pipe Co. of Birmingham, Ala., explained the difficult situation of the South in this connection and empha-

sized the fact that conditions in a shop must be made fit for young men who wish to enter it. A. E. Hageboeck of the Frank Foundries of Moline concluded that, after

all, the problem was up to the manufacturer, as oftentimes the school boards do not believe in vocational education.

Test Bars, Coke and Charcoal Pig Iron

A LARGE part of the session devoted to gray cast iron was taken up with the test bar controversy. The international bar and the A. S. T. M. both figured prominently; oxygen and other gases were also discussed. A. B. Root, Hunt-Spiller Mfg. Corporation, Boston, presided.

International Test Bar

The adoption of an international test bar was announced in the report of the Committee on Gray Iron Castings, H. B. Swan, Cadillac Motor Car Co., chairman, which was read by E. J. Lowry, secretary. The committee was asked to investigate this subject in conjunction with the International Test Bar Committee, comprising representatives from eight countries, H. B. Swan being the American member. The vote of the Committee on Gray Iron Castings was unanimous for a 1.2-in. diameter, 18-in. long test bar, to represent "the character of the metal in the ladle from which it was poured and not to be representative of the castings made from the ladle of iron." It pointed out that in the English method of testing, three different test bars are used of the following dimensions: 0.875 in. in diameter x 15 in. long, 1.2 in. in diameter x 21 in. long and 2.2 in. in diameter x 21 in. long. The committee, however, is of the opinion that the 0.875-in. test bar is too small for accurate results and that the 2.2-in. bar is too heavy for the average testing machine. Furthermore, the factor of good castings is essential to the foundryman in producing test bars because he ordinarily casts but one set and, should these be flawed, he would lose the opportunity of establishing a record for his heat.

It was found that only one-third of the 0.875-in. diameter test bars were good castings. This diameter test bar also gave a very erratic deflection curve as compared with a very good deflection for the 1.2 and 1.3-in. bars. The 1.4, 1.5 and 2.2-in. bars also gave good deflection curves, but the factor of the load required to break them places them out of consideration. The committee also announced that it had adopted the specification for high-test cast iron of the American Society of Testing Materials. The A. S. T. M. specifications for pig iron, however, were adopted only as a guide for the purchase of pig iron. The A. S. T. M. specifications for cast iron car wheels were likewise accepted.

Discussion

In commenting on the report, Dr. Richard Moldenke, Watchung, N. J., stated that the question of good pig iron is so important that the time has come to determine specifications for what constitutes good pig iron to guide the foundryman in case he wants to pay for it.

The A. S. T. M. Bar

"Notes on the Composition and Structure of the A. S. T. M. Test Bar" was the subject of a paper by J. W. Bolton, Niles Tool Works, Hamilton, Ohio. Experiments were conducted by the author in an attempt to show some of the effects of variations in composition and structure on the properties of the standard A. S. T. M. bar. Extensive tests from various mixtures were studied and the results obtained were compared from all angles. Consideration was first given to the effect of silicon and total carbon variation on the transverse strength, because it is through these elements that the practical foundryman is best able to control the physical properties of his metal. The sum, silicon plus carbon, varies inversely with the transverse test—very closely for various semi-steels and reasonably so for regular cast iron. This sum gives a more accurate idea of the probable strength of the bars than any other simple and inexpensive test.

Steel seems to exert effect on strength *per se*. The

major part of the variations between results on cast irons and semi-steel can be explained by various differences in the analyses. Notwithstanding these there remains a gap which is bridged only by assuming that the steel has some intrinsic merit besides its known effect on composition. Different processes in iron and steel manufacture give different strengths for the same analysis and many of these process effects have been explained in a satisfactory manner. Total carbon seems to exert a greater influence on the strength of the bar than silicon. Experiments also indicated an increasing strength, attributable to an increase in combined carbon and a decrease in graphite. The increase in combined carbon, however, increases the strength to a maximum at 0.70-1.00 per cent, from which point the strength falls off very rapidly. The author found no relation between the percentage of total carbon and combined carbon.

Referring to three other elements commonly found in cast iron, namely manganese, sulphur and phosphorus, Mr. Bolton is of the opinion that variations in these elements probably have very little effect on the strength of the metal.

After comparing test results from several types of test bars, the author reached the conclusion that until much more research data are available, it is best to retain the present standard bar. Smaller bars do not seem to show the effects of the elements so well and the larger bars depend more on pouring temperatures.

Controlling Properties by Testing

"Testing Iron to Control the Properties of Castings" was the title of a paper read by G. W. Gilderman, Dodge Mfg. Corporation, Mishawaka, Ind. No one test or series of tests has been developed to indicate the exact condition of the casting from the standpoint either of its chemical or its physical properties. Each test has a definite value, but additions or deductions must be made to the result to indicate what may be expected in the castings poured from the same iron. Intelligent consideration must be given to the difference in size and shape of the test pieces compared with the proposed castings. Factors that make test bars unreliable are discussed by the author and examples are cited.

Effect of Chill

"The Effect of Chill on Cast Iron," a paper by E. J. Lowry, Hickman, Williams & Co., Chicago, presented the results of a series of investigations. Four-inch square castings were made to determine the effect of pouring temperature and the rate of cooling on chills. Analyses made on planings taken from sections of these blocks indicated that the chemical elements are not uniformly distributed throughout the same block and that deposition of these elements varied with the casting temperature and the rate of cooling. Oxidation in iron produces chill in iron, while aluminum as a deoxidizer softens the chilled iron. An investigation on chill rolls was made to verify the experimental results. Rolls were made from both cupola iron and air furnace iron. Another series of tests was made on car wheel iron. The following conclusions were drawn:

In ordinary chill iron the chiller rejects the chemical elements from the chilled surface of any iron poured in contact with it. Sulphur upsets the normal solidifying rejections when it is in increased percentages over the regular run of cast iron. Air furnace metals produce superior qualities in the structure of cast irons. Chemical analyses of cast irons have but varying values, due to segregation of the elements in the cast iron.

Where Chemical Analysis Fails

"Characteristics that Chemical Analysis Fails to Disclose in Pig Iron and Castings" was discussed by

W. E. Jominy, Department of Engineering Research, University of Michigan. The author examined approximately 100 samples of pig iron in the investigation which he made and found that there are large differences in iron having the same chemical analysis and that these differences persist through the remelting stages. His discussion dealt particularly with the differences between coke and charcoal irons of the same analyses, supporting the theory that charcoal iron is the superior. An examination of the microstructure of the irons indicated that there is a distinct tendency for the coke irons to have large graphite flakes and for the charcoal irons to have small flakes. The author, however, is unable to explain the reason for this difference.

Discussion

In a prepared discussion of Mr. Jominy's paper, Mr. Lowry offered the opinion that the merit of charcoal iron lies in the process by which it is manufactured, which is sharply contrasted with the large scale production methods in vogue at the coke furnaces. The smaller graphite flakes in charcoal iron perhaps constitute the major factor in giving the increased strength and may be the result of the different smelting practices employed.

Neither Mr. Lowry nor Mr. Jominy shares the belief of J. E. Johnson, Jr., that oxygen inclusions in charcoal iron account for its superiority. Mr. Johnson's contentions are believed to be based upon too few tests to be taken as conclusive. Mr. Lowry also pointed out that oxygen often proves a weakener of cast iron because it creates chill and sluggish qualities in the metal. In his opinion there is little more justification for Mr. Johnson's conclusions than to attribute the superior qualities of Swedish charcoal iron to the presence of fixed nitrogen and vanadium in that metal. Such an assumption would be no more than a guess.

Referring to the matter of oxygen inclusions in the iron, Mr. MacKenzie cited experiments conducted by him which indicated that a high shrinkage iron

contained eighteen times as much oxygen as a normal iron.

It was also pointed out in the discussion that Mr. Jominy's analyses were for only the five common elements in pig iron, namely silicon, manganese, sulphur, phosphorus and carbon. It was suggested that the differences between charcoal and coke iron may after all be explained chemically when complete chemical analyses are made. Homer F. Staley, Metal & Thermit Corporation, New York, suggested that the presence of rare elements might have an important effect on the crystallization of graphite. It has been found, for example, that a very small amount of titanium or vanadium has a decided effect on the size of the grain structure in granite. He inquired whether the ores used in making various irons tested were the same. He also stated that an analysis of iron might not show the presence of a gas responsible for a crystalline structure because the gas might not remain in the metal.

In reply Mr. Jominy stated that the irons upon remelting showed the same crystalline structure as before, indicating that whatever was responsible for the formation was still present in the metal. He also asserted that the ore used for making the irons was the same in each case.

Melting Steel in a Cupola

"Melting Steel in a Cupola" was the subject of a paper by J. Grennan, University of Michigan. Data were presented showing the results of experiments conducted with a view to observing what actually happens to steel when it is melted in a cupola. Holes were cut in the side of the cupola at various heights above the tuyeres and pieces of the stock were removed and examined. The investigation seemed to point out that heavier steel than is generally employed may be used as a part of cupola charges, as the oxidation of the steel is thereby reduced. A point stressed is that great care must be used in making up the charges to get uniform results.

Annual Business and Other Meetings

DURING the annual business meeting, Wednesday afternoon, officers were named for the ensuing year:

L. W. Olson, who has been vice-president, was elected president. Mr. Olson is works manager of the Ohio Brass Co., Mansfield, Ohio. A. B. Root, Jr., mechanical engineer, Hunt-Spiller Manufacturing Corp., Boston, Mass., was elected vice-president and the following directors were named:

For one year: V. E. Minch, president, American Foundry Equipment Co., New York City. For three years: G. H. Clamer, vice-president and general manager, Ajax Metal Co., Philadelphia; John E. Galvin, president, Ohio Steel Foundry Co., Lima, Ohio; A. E. Hageboeck, secretary, Frank Foundries Corporation, Moline, Ill.; R. A. Nourse, vice-president and general manager, Stowell Co., South Milwaukee, Wis., and William J. Nugent, vice-president and general manager, Nugent Steel Casting Co., Chicago.

International Foundrymen's Convention

The members took definite action toward holding an international foundrymen's convention in this country in 1926 by the adoption of a report on this matter submitted by the secretary, which had been adopted a few days previously by the board of directors. A motion was adopted to send an official invitation to attend the proposed convention to all the foundry associations throughout the world. The time and place of the convention will be decided later.

President's Address

President G. H. Clamer, Ajax Metal Co., Philadelphia, in his annual address reviewed the work of the association and spoke of the activity of the foreign associations, now more than 20 in number, that are disseminating technical information on foundry subjects.

He outlined the general policy of the association

since its organization and said that invitations are being constantly received from various sources to use the association's influence in assisting to promote legislation, to back some phase of the labor problem, or to lend support to projects outside the scope of the association. When it is clearly indicated that the project is entirely outside the association's field of activities it is easy to refuse, but often the projects presented are on what may be termed the border line. In order to define clearly the legitimate field of the A. F. A., he proposed that the directors take up this subject for discussion, the question being should the association confine its activities to the truly technical, or should it cover all subjects of whatever nature that are of benefit to the casting industry, or should it, as in the past, adhere strictly to the field set down by its organizers. At a meeting of the board held during the convention this subject was discussed and the president was authorized to appoint a subcommittee on policy, that committee to report definite recommendations at the November meeting.

Cooperative Research

Taking up the subject of cooperative research, Mr. Clamer said that he did not believe that the organizers of the association comprehended the advantages to be derived from organized cooperative research as it is known today. He referred to the organizations carrying on research work in the foundry industry in Europe and said that the present-day research associations had developed largely as a result of cooperation between the many units of industry and the governments during the war. In this country various associations are seeking new uses for their products and are endeavoring to improve their quality and to render service of a technical and commercial nature for the purpose of reducing costs and creating more economy, real marketing conditions, etc. In this connection he referred to the im-

portant research work that has been done by the American Malleable Castings Association under Professor Touceda.

In the industry which the A. F. A. represents, the first organized effort in the direction of true cooperative industrial research was taken by the electric steel

the past two years. The resolution committee consisted of A. O. Backert, chairman; W. R. Bean and V. E. Minich.

World Outlook for American Foundrymen

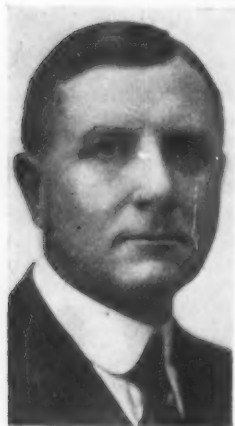
Following the business session a paper entitled "A World Outlook for American Foundrymen" was presented by H. Cole Estep, Penton Co., Cleveland. The author said that in the six years since the armistice there has been a great quickening of mutual interest among casting manufacturers throughout the world. The American foundry industry is in a position to make its influence felt abroad as never before and to absorb much from the Old World that will be beneficial to American foundrymen. He traced the growth and effects of the international movement among foundrymen since the war and said that the best European thought on technical problems is now being brought to American foundrymen and that foundrymen of all countries are reaping benefits from their improved international outlook. One source of benefit is found in the spread of the foundry equipment exhibition idea to Europe and another is in the stimulation of closer personal ties between the foundrymen of the Old and New World.

European foundry practice, the author said, has been of assistance to America in two directions. American foundrymen are indebted to Europe for craftsmanship that has brought us skill which our foundries have adapted to suit American conditions and Europe has also done a great deal in the way of technical investigations. European shop practice, the speaker pointed out, is now having a great influence in the foundry industry in America. On the other hand, American shop practice is having a great deal of influence on Europe. Europe is now looking largely to the United States for the application of labor-saving equipment to the production of castings. We are in a position to give leads to Europe in the direction of applying machinery and the energies of trained technical men to the problems of shop practice. In the field of automotive castings the influence of American methods is felt abroad.

The speaker pointed out that American manufacturing methods are influencing European foundry practice in another direction, referring to what may be termed the American conception of quantity production. However, he said the idea persists in some European quarters that high-speed production implies a lowering of quality standards and that the American foundry industry must show Europe that quantity and quality production go hand in hand.

Medals Bestowed at the Banquet

A feature of the banquet at the Pfister Hotel, Wednesday evening, which was largely attended, was the presentation of two of the medals, the endowment for which was established at the Columbus convention in 1920. G. H. Clamer, president of the association, who acted as toastmaster, called upon Alfred E. Howell, general manager, Somerville Stove Works, Somerville, N. J., who, in a brief address, bestowed upon Enrique Touceda the John A. Penton medal. This was given in recognition largely for Professor Touceda's work in connection with conducting the research investigations for the American Malleable Castings Association. R. A. Bull, research director, Electric Steel Founders' Research Group, Chicago, was called upon to bestow the J. H. Whiting medal on John Howe Hall, chief metallurgist, Taylor-Wharton Iron & Steel Co., High Bridge, N. J. Mr. Bull called attention to various achievements of Mr. Hall, among which were his book on steel foundry practice, his contributions to various technical societies, his discovery of what is now known as high manganese steel, and his work in the metallurgy of manganese steel proper. Both Professor Touceda and Mr. Hall accepted the medals, expressing their gratification in well-chosen words. The orator of the occasion was Dr. G. W. Dyer, professor of political economy, Vanderbilt University, Nashville, Tenn., who delivered a most effective address, largely of a general political nature. It was a strong plea for the



L. W. Olson, formerly vice-president, is the newly elected president for the next year. He is works manager of the Ohio Brass Co., Mansfield, Ohio

founders research group, the object of which is to improve the quality of their production and reduce costs. He also referred to the important work that has been accomplished by the joint molding sand research committee that was fathered and financed by the A. F. A. The results of this committee's work, he said, form a valuable contribution to the literature on the subject. He also praised the work of the committee on industrial education and training of apprentices.

Mr. Clamer also discussed the international research work that was inaugurated at the International Congress of Foundrymen in Paris last year, and outlined the program of study to be followed to determine the American recommendation for a test bar. The president also outlined the work during the past year of the various committees of the association and spoke of the enjoyable and profitable tour taken abroad by the delegates of the American association last summer.

The president, as part of his address, announced the winners of the A. F. A. awards for the year. The John A. Penton medal, which was awarded for the first time, was bestowed upon Prof. Enrique Touceda, metallurgist of the American Malleable Castings Association, for his outstanding work in connection with improving the quality of malleable iron. The J. H. Whiting medal was awarded to John Howe Hall, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., for his distinguished work in connection with the manufacture of steel castings. Secretary Hoyt announced that the board of awards had awarded the 1924 S. Obermayer prize to Herman Honold, superintendent of the Blake & Knowles Works of the Worthington Pump & Machine Corporation, East Cambridge, Mass. This prize, a clock, was awarded for the development of a cylinder machine for molding gagers and core rods.

During the business session Mr. Clamer, the retiring president, was elected an honorary member of the association.

Next Convention

Invitations for the next meeting place were received from Atlanta, Columbus, Chicago, Detroit, Indianapolis, Syracuse and San Francisco, and were referred to the board of directors.

The usual resolutions were adopted expressing appreciation of the hospitality extended by Milwaukee and the various organizations in that city. A resolution was also adopted commending the methods pursued by the Milwaukee Vocational School in the training of foundry apprentices and recommending to the members the establishment of similar schools in their communities. Another resolution commended most highly the work of the sand research committee which was characterized as one of the great accomplishments of

maintenance of the principles of the Constitution and an argument against some of the radical tendencies of today.

The Obermayer Prize

The S. Obermayer prize was awarded this year to Herman Hanold, foundry superintendent, Blake & Knowles Works, Worthington Pump & Machinery Corporation, East Cambridge, Mass. The committee making the award was E. M. Handley, foundry superintendent, Chain Belt Co., and H. E. Mooney, foundry superintendent, the Falk Corporation, Milwaukee. The



A Model of the Cylinder Machine for Molding Gagers and Core Rods for Which the Obermayer Prize Was Awarded. The recipient of the prize, Herman Hanold, is at the right

illustration gives some idea of the device for which the prize was awarded. It is a cylinder machine for molding gagers and core rods. Twenty-four sets of these can be molded in 18 min. The cylinder is of hard wood on each end of which are steel wheels which roll on steel rails on a bed of concrete. Between the rails is the proper sand mixture. In operating this device about four minutes is allotted to forking the sand, five to scraping the bed, one and one-half minutes for operation of the cylinder in making the impression in the sand, six and one-half minutes for pouring and two minutes for stripping.

Foreign Foundrymen Are Guests

Several foundrymen from foreign countries contributed to the activities of the convention or were present as interested spectators. Two distinguished foundrymen from France and Belgium were official representatives of the respective foundrymen's associations of those two countries. Robert Ronceray, Paris, represented the former, and Paul Roapsy, Antwerp, Belgium, represented the latter. P. N. Davies and J. V. Robertson, of Davies, Baird & Robertson, Melbourne, Australia, and Thomas Begg, of Metters, Ltd., Sydney, Australia, were guests of the association. F. W. Bridges, British Shipping & Engineering Machine Co., London, was present during part of the week,

as were also Jean Dumortier of Brussels, and A. La-Croix Galler of Antwerp, Belgium.

Special Meetings

Several organizations held meetings during the week. Prominent among these was the Foundry Equipment Manufacturers' Association, which held a dinner, followed by an entertainment, at the Wisconsin Hotel, Monday evening, Oct. 13. On Thursday afternoon the Steel Founders Society of America held a business meeting and on Wednesday, Oct. 15, the committee on papers of the foundrymen held a luncheon at the Wisconsin Hotel.

The sessions of the Institute of Metals and the account of the exhibition will be found on other pages.

Automobile Production in September

Revised figures for the production of automobiles have been issued by the Department of Commerce (see THE IRON AGE, Oct. 16, page 1005, for preliminary figures issued by the National Automobile Chamber of Commerce). The September total is given by the department as 257,947 passenger cars, the highest figure since May, and 30,061 trucks, also the highest figure since May. This makes the 9-month production amount to 2,553,681 passenger cars and 274,475 trucks, compared with 2,741,764 passenger cars and 290,319 trucks for the first nine months of last year. Except for last year, this year shows by far the highest totals ever recorded.

Pittsburgh Steel Co. Annual Report

The report of the Pittsburgh Steel Co. and subsidiary companies for the year ended June 30 shows net income of \$1,558,680, after charging off \$1,337,009 for depreciation and depletion, \$214,093 for a reduction of inventory values and including in operating costs \$3,232,331 for maintenance, repairs and replacements. After payment of cash dividends of 7 per cent on the preferred stock and 5 per cent on the common stock, amounting to \$1,539,994, there remained \$18,686 to be added to surplus. Total sales for the year were \$23,926,890, a decrease of \$5,190,227 from the previous year. Current assets amount to \$13,098,726, against current liabilities of only \$1,772,307.

Ford Plants in Australia

The Ford Motor Co., Detroit, has formed a new company to be known as the Ford Motor Co. of Australia, capitalized at \$5,000,000, to be operated as a subsidiary of the Ford Motor Co. of Canada. Plans are being perfected for the construction of six plants on sites to be selected in Australia, five designed for assembling, and the sixth to be used for body manufacture. They are estimated to cost \$3,500,000, with machinery. The Ford Motor Co. of Canada will manufacture chassis for the Australian branch, shipping in parts, to be assembled at the last noted works. S. C. French, heretofore assistant sales manager, will be manager of the Australian company.

Mechanical stokers sold in September by 13 establishments numbered 73 and aggregated 25,988 hp. Except for last November, this is the lowest horsepower total in two years. Previous figures, however, came from 15 establishments in place of 13, which accounts for part of the difference. The present figure compares with 41,931 hp. in August and with 60,486 hp. in September, 1923.

The Westinghouse Air Brake Co. has adopted a full time operating schedule at its Wilmerding, Pa., works, replacing a 2- to 4-day week production basis, operative for some time past. Additions have also been made in the working forces in a number of departments.

Plans of New Companies

The York Corrugating Co., York, Pa., will manufacture under contract metal radiator shields for the newly organized Radashield Distributors, Inc., care of Sheridan & Tekulsky, 152 West Forty-second Street, New York. In making the product 18- and 20-gage sheet stock is required and 18-gage aluminum.

The International Duplex Air-Rotors Corporation, 301 Madison Avenue, New York, recently incorporated with capital stock of \$1,000,000, Delaware laws, controls patents in the United States and foreign countries on a ventilating machine for mechanical uses. Details of manufacturing plans are not yet available.

The O. K. Level Works, 509 Chicago Street, Green Bay, Wis., recently organized, is manufacturing levels. Alvin Rousseau is president and F. S. Griswold, secretary-treasurer.

The Meriden Auto Machine Co., 100 Ann Street, Meriden, Conn., has been organized to recondition automobile motors, reborring cylinders, making special size pistons and rings, grinding crank shafts and the like. J. E. Champagné is manager.

Assets and property of the H. C. S. Motor Car Co., Indianapolis, of which Harry C. Stutz is president, have been taken over by a new company, the H. C. S. Cab Mfg. Co. Mr. Stutz is president of the new corporation and Henry F. Campbell is secretary-treasurer. The company will continue the manufacture of automobiles and in addition will manufacture a medium priced taxicab.

Radio Owners, Inc., New York, has been incorporated with capital stock of \$2,000,000 to manufacture radio instruments and equipment. E. Lester Barnes, 270 West End Avenue, who is the principal incorporator, is away on a four-weeks' business trip. Details of manufacturing plans have not yet been revealed.

The Chickasaw Tank Car Corporation, care of Mr. Stancliffe, Hardy, Stancliffe & Whitaker, 165 Broadway, New York, recently incorporated with 344 shares of stock, no par value, represents an organization of bondholders of the old Chickasaw Refining Co. of Oklahoma. This organization, as near as can be ascertained, is merely for the expeditious use or disposal of tank cars owned by the Chickasaw Refining Co.

The F. & F. Automotive Equipment Co., 1461 First Avenue, New York, incorporated with \$25,000 capital stock, will act as distributor of automotive equipment and supplies. Arthur Fuld heads the company.

The Cap Screw & Nut Co. of America, 45 Lafayette Street, New York, recently was incorporated to act as direct representative for several manufacturers of bolts, nuts, cap screws, washers, etc., handling these items exclusively.

The Velvet Shift Corporation has been incorporated with \$25,000 capital stock to manufacture motor appliances. The organization is still in the formative stage, but according to Herman Kahn, 15 Park Row, the company's representative, manufacturing eventually will be undertaken.

The Telephon Corporation of America, 100 Hudson Street, New York, has been organized with authorized capital of \$525,000 and plans to manufacture and distribute a new design of telephone instrument. For the present the apparatus will be imported from Germany, but as soon as possible factories will be established in this country to manufacture parts of, and possibly the entire apparatus. The instrument has been put to practical use in Germany. Edward Jolles is president.

The Guarantee Sheet Metal & Stove Works, College Point, L. I., recently incorporated with nominal capital, will manufacture sheet metal products and stove equipment on a limited scale. Operations have been started. H. Blatt and S. Brandes are the principals.

The Thornton-Cameron Mechanical Store Corporation, Johnson City, Tenn., has been organized to manufacture as indicated by the name. Its object is to exploit an invention, and the manner in which this will be done has not yet been determined. W. C. Thornton is president.

Trade Changes

Smith's Inventions, Inc., has opened an Eastern plant in Philadelphia at 1526 Race Street, where a complete stock of equipment, parts and welding supplies will be carried.

The Electric Furnace Co., Detroit, has moved its office address to 2331 National Bank Building.

The Cincinnati Frog & Switch Co., Cincinnati, represented in the New York district by John L. Barry, has moved its offices from 1 Madison Avenue to 30 Church Street.

The Conveyors Corporation of America, maker of tanks, conveyors and air-tight doors, 326 West Madison Street, Chicago, has appointed the W. P. MacKenzie Co., 1234 Callowhill Street, Philadelphia, as sales representative in southeastern Pennsylvania and southern New Jersey. The MacKenzie organization also handles the sale of products of Alphons Custodis Chimney Construction Co., International Filter Co., Peabody Engineering Co., L. J. Wing Mfg. Co., and others.

Joseph N. Smith & Co., makers of steel molds and commercial hardware, have moved their factory from East Grand Boulevard and Dubois Street, Detroit, to 5914 Federal Avenue.

The H. A. Smith Machinery Co., 501 East Water Street, Syracuse, N. Y., has been appointed exclusive representative in the Syracuse territory for Rockford millers and Sundstrand lathes, manufactured by the Rockford Milling Machine Co., Rockford, Ill.

The M. A. Hanna Co. has been appointed exclusive sales agent for the Woodland Coal Co., Scottsdale, Pa., mines of which are located at Whitaker Sliding, W. Va. This mine is producing 1000 tons of coal daily.

Harry Hodgett has resigned his position as superintendent of furnaces for the Joseph E. Thropp Co., manufacturer of pig iron, Earlston, Pa., and has taken over the properties and plant of the Batesville Silica Sand Co., Everett, Pa., for development. Mr. Hodgett was previously superintendent of the Pittsburgh Crucible Steel Co., Midland, Pa., for six years, and for various periods was with the Republic Iron & Steel Co., Struthers Furnace Co. and Carnegie Steel Co.

The McCabe & Sheeran Machinery Corporation has been engaged by the Worthington Pump & Machinery Corporation to make complete disposition of all of the machinery and equipment of the Power & Mining Machinery Works at Cudahy, suburb of Milwaukee, which operation the Worthington company recently abandoned upon disposing of its local business to the Allis-Chalmers Mfg. Co., Milwaukee.

STEEL AND INDUSTRIAL STOCKS

The range of prices on active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers ..	55	57 1/2	Lima Loco.	59	60 1/2
Am. B. S. & Fdy. 80 3/4	80 3/4	80 3/4	Midvale Steel ...	25	25
Am. Can.	124 1/2	130 3/4	Nat.-Acme.	4 1/2	4 1/2
Am. Can. pf.	115 1/2	115 1/2	Nat. En. & Stm. 20 1/2	20 1/2	22 1/2
Am. Car & Fdy. 163	166	166	Nat. En. & S. pf. 71	71	71
Am. Locomotive. 76	77 1/2	77 1/2	N. Y. Air Brake 39 3/4	41 3/4	41 3/4
Am. Loco. pf.	120	120	Otis Steel.	7 1/2	7 1/2
Am. Radiator.	115	117 1/2	Otis Steel pf.	44 1/2	46
Am. Steel Fdries. 35 1/2	36 1/2	36 1/2	Pressed Stl. Car 43	44 1/2	44 1/2
Am. Stl. Fd. pf. 106 1/4	106 1/4	106 1/4	Pressed Stl. pf. ...	71 1/2	71 1/2
Bald. Loco.	115 1/2	120 1/2	Replodge Steel ..	10 1/2	11 1/2
Beth. Steel.	42 3/4	44	Republic.	42 3/4	44 1/2
Beth. Stl. 7% pf. 93 3/4	93 3/4	93 3/4	Republic pf.	84	85
Beth. Stl. 8% pf. 107 1/4	107 1/4	107 1/4	Sloss-Sheffield ..	66 1/2	70
Chic. Pneu. Tool 85	85	85	Steel of Canada. 76 1/2	76 1/2	76 1/2
Colo. Fuel.	35	42 3/4	Transue-Wms. ...	29	29
Crucible Steel ..	53 1/4	55 3/4	Un. Alloy Steel. ...	21	21
Crucible Stl. pf. ...	89 1/4	89 1/4	U. S. Pipe.	106 1/4	112 1/2
Deere, pf.	77	77	U. S. Pipe pf.	98 1/2	99
Gen. Electric.	239 3/4	250	U. S. Steel.	104 3/4	107 1/2
Gt. No. Ore Cert. 28 1/2	29 1/4	29 1/4	U. S. Steel pf.	121 1/2	122 1/2
Gulf States Steel 67 1/2	70 1/4	70 1/4	Vanadium Steel. ...	22	22 1/2
Inland Steel.	36 1/2	40	Va. I. C. & Coke 76	76	76
Int. Har.	91 1/4	93	W'house Air Br. 92 1/4	92 1/4	92 1/4
Int. Har. pf.	111	111 1/2	Y'gstown S. & T. 65	66 1/2	66 1/2
Jones & L'lin pf. 110 1/2	110 1/2	110 1/2			

Schedules filed by the Falls Motors Corporation, Sheboygan Falls, Wis., in answer to involuntary bankruptcy proceedings, appraise the assets at \$833,951 and admit liabilities of \$710,166, of which \$519,250 is secured. The largest unsecured creditors are the Jefferson Forge Products Co., Detroit, with a claim of \$39,857, and A. M. Andrews & Co., Chicago, with a claim of \$52,579. Assets consist of real estate, \$475,067; machinery and equipment, \$102,447; merchandise, \$145,577; personal property, \$77,712, and accounts receivable, \$20,045.

The assets of the American Bearings Co., Milwaukee, manufacturer of ball and roller bearings, will be sold at public auction on Nov. 14, at the office of the plant, Forty-seventh Avenue and Rogers Street, by James W. Bryden, receiver.

The court has given bidders on the Hill pump plant of the Midwest Engine Corporation, Anderson, Ind., now in receivership, until Oct. 24 to increase their bids. Huntley Gordon, Boston, representing a syndicate, presented a bid of \$176,910, the appraised value of the property. Theodore Frazier, Anderson, and associates bid \$1,000 higher than the appraised value. The Union Trust Co. of Indianapolis and Charles Jewett are the receivers.

Machinery Markets and News of the Works

SOME IMPROVEMENT NOTED

Maxwell Motors Corporation Buys About 40 Tools for Chrysler Plant

Commonwealth Edison Co., Chicago, Issues a Small List—A Little Railroad Buying

Improvement in machine-tool business is noted principally at Cincinnati. At Chicago buying continues to lag as the presidential election approaches and the same is true in other districts. Cincinnati reports more inquiry and a few more orders.

The largest transaction of the week was a purchase by the Maxwell Motors Corporation of about 40 tools for its Chrysler automobile plant and also for its New-castle, Ind., plant.

A fair amount of railroad buying is being done and several lists are pending on which action will probably be taken after election if the result is encouraging to the railroads. The Southern Railway has bought a number of heavy machines.

The Commonwealth Edison Co., Chicago, has issued an inquiry for nine machines. The Chicago Board of Education, which recently has been a buyer of school-room equipment, will enter the market for 24 engine lathes for the Tilden High School, that city.

New York

NEW YORK, Oct. 21.

THE Southern Railway last week bought a car-wheel lathe, an axle lathe and three steam hammers, and the Chesapeake & Ohio bought a 90-in. wheel-quarterming machine. This railroad buying was probably the most important business of the week. Business has not improved and consists of orders for single machines, the number of which does not show any marked increase. An Eastern tool builder received an order for a side-head boring mill from the Ohio Injector Co., Wadsworth, Ohio.

Contract has been let by the American Can Co., 120 Broadway, New York, to A. W. Quist & Co., Hoge Building, Seattle, for the erection of a six-story addition to its Seattle works, 120 x 360 ft., to cost approximately \$850,000 with machinery. C. J. Preis, New York office, is chief engineer.

Steam power equipment, transmission apparatus, factory trucks, etc., will be installed in the four-story mechanical laundry to be erected by the Colonial Laundry, 16-20 Lexington Avenue, Brooklyn, estimated to cost \$200,000, for which bids will be asked in November. McCarthy & Kelly, 159 Remsen Street, are architects.

The State Electricity Commission of Victoria, Melbourne, Australia, is taking bids until Nov. 24 for a quantity of 42,000-volt cable and accessory equipment for the Yallourn power scheme.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 4 for miscellaneous machine screws and nuts for the South Brooklyn Navy Yard, schedule 2791.

Max L. Epstein, 327 Fenimore Street, Brooklyn, plumbing and heating equipment and supplies, has plans for a four-story factory, 100 x 225 ft., at 361-81 Stagg Street, to cost \$150,000 with equipment. McCarthy & Kelly, 159 Remsen Street, are architects.

Preliminary plans are under consideration by the La Paz-Yungas Railway, La Paz, Bolivia, for the electrification of its line from La Paz to Coroico, including electric power plants and power substations, to cost \$2,000,000. Jesse S. Cottrell, American Minister, La Paz, has information regarding the project.

The F. D. Lincoln Co., 50 Church Street, New York, contractors' equipment, has inquiries out for locomotives, Mogul type, 36-in. gage, 25 to 40 tons capacity; also trucks, 36-in. gage, 4 or 8 wheels, 24 in. diameter, spring bolsters.

The Long Island Railroad Co., Pennsylvania Terminal, New York, has awarded a general contract to John Thatcher & Son, 60 Park Avenue, Brooklyn, for a one-story addition to its motor equipment and construction shops at Morris Park, N. Y., 115 x 150 ft.

William Shary, 22 East Seventeenth Street, New York, architect, has plans under way for three automobile service, repair and garage buildings, consisting of a two-story struc-

ture, 95 x 100 ft., on East Ninth Street, to cost \$55,000; two stories, 70 x 97 ft., on East Fifth Street, to cost \$50,000, and two stories, 100 x 102 ft., on East Seventy-fourth Street, to cost \$50,000.

The Marko Storage Battery Co., 1402 Atlantic Avenue, Brooklyn, has filed plans for a two-story addition, 30 x 100 ft., for which plans were drawn by Magnuson & Kleinert, 52 Vanderbilt Avenue, New York, architects.

Henry Donahue, 652 Van Courtland Park, Yonkers, N. Y., and associates, will build a one-story foundry, 73 x 82 ft., to cost approximately \$50,000 with equipment. Contract has been let to the F. L. Whitney Co., Yonkers. R. Conant, Warburton Avenue, Yonkers, is architect.

The Navy Purchasing Office, South and Whitehall Streets, New York, will purchase four exhaust blowers, N. E. A. Requisition 203.

The Bronx Gas & Electric Co., 43 Westchester Square, New York, has plans for a one-story power substation, 35 x 95 ft., at St. Peter's and Westchester Avenues, estimated to cost \$55,000 with equipment. W. W. Knowles, Electric Building, Bridge Plaza, Long Island City, is architect.

The Board of Education, Rutherford, N. J., plans the installation of manual training equipment in the two-story grade and junior high school to be erected on Union Avenue estimated to cost \$400,000, for which new bids have been asked on a general contract. Ernest Sibley, Bluff Road, Palisades, N. J., is architect.

The Ethyl Gasoline Co., Wilmington, Del., lately formed under Delaware laws, with capital of \$5,000,000, as a subsidiary of E. I. du Pont de Nemours & Co., Wilmington, has work in progress on a five-story plant, 68 x 140 ft., at Deep Water Point, near Pennsville, N. J., for the manufacture of a special gas fuel for automobiles. The complete plant will cost \$3,000,000 with machinery. New York offices are at 25 Broadway. A. E. Mittnacht is secretary.

Manual training equipment will be installed in the two-story high school to be erected at Sunset Avenue and Comstock Street, Asbury Park, N. J., estimated to cost \$800,000, for which a general contract has been let to the McClary Corporation, 92 William Street, New York. E. A. Arend, 105 West Fortieth Street, New York, is architect.

The Newark Pipe Cutting & Threading Co., Newark, N. J., has been organized by Frederick W. Betschick, 344 Clinton Place, and associates, to operate a plant at 34 Rector Street, where a building has been leased.

The Thatcher Furnace Co., 41 St. Francis Street, Newark, N. J., has awarded a general contract to the Wigton & Abbott Co., 552 West Twenty-third Street, New York, for a four-story foundry and general works addition, 50 x 83 ft., to cost \$40,000.

The White Metal Mfg. Co., Hoboken, N. J., advises that an item stating that it intended building a plant in Toronto is incorrect. The company does not contemplate erecting a plant there.

The International Motor Co., New Brunswick, N. J., is inquiring for a 3000-lb. skull cracker, with or without tongs and release apparatus.

Buffalo

BUFFALO, Oct. 20.

SOME business is being done in used tools, mostly single machines and all standard make. The past week with a few sellers was the best in some time. Large inquiries are absent from the market.

A general contract has been awarded to Fred H. Johnston, local, for the erection of a four-story garage and service station, 123 x 157 ft., for the Elmira Garage Corporation, Elmira, N. Y. A. J. Winton is president and manager.

The Lorscheider-Schang Co., 45 Andrews Street, Rochester, N. Y., manufacturer of paper boxes and corrugated equipment, has acquired a six-story plant at 147 North Fitzhugh Street, which will be remodeled. New machinery, transmission, conveying and power equipment will be installed. George E. Bartold is manager.

The Mac Tool Mfg. Co., East Rochester, N. Y., has acquired the plant of the Everyday Piston Ring Co., and has plans under way for extensions and the installation of additional equipment.

Ground has been broken by the Ellison Bronze Co., Falconer, N. Y., for a one-story foundry adjoining its four-story finishing plant on West Main Street, for which considerable equipment will be required.

General contract has been awarded to the Folwell-Ahlskog Co., Chicago, by the Erie Lithographing Co., Erie, Pa., for a three-story and basement plant, 110 x 330 ft., to cost \$500,000, for which considerable equipment will be required. E. R. Lowe is general manager.

Plans have been filed by Joseph Keller & Son, 1170 Elk Street, Buffalo, for a one-story concrete block machine shop to cost \$10,000 exclusive of machinery.

A tract of 12 acres at Buffalo has been acquired by the Saskatchewan Cooperative Elevator Co., Ltd., Regina, Sask., for a new grain elevator, estimated to cost \$800,000 with hoisting, conveying, electric power and other equipment. The plant is expected to be ready for service next summer. F. W. Riddell is general manager.

The Benedict Mfg. Co., East Syracuse, N. Y., is in the market for a number of second-hand duriron tanks of 500 or 600 gal. capacity.

Philadelphia

PHILADELPHIA, Oct. 20.

THE United States Pencil Co., Sixtleth and Baltimore Streets, Philadelphia, has awarded a general contract to McCloskey & Co., 1620 Thompson Street, for a two-story and basement addition, 60 x 220 ft., to cost approximately \$70,000. William H. Gravell, Otis Building, is architect and engineer.

William & Harvey Rowland, Inc., Tacony and Lewis Streets, Philadelphia, will erect a one-story addition, for which a general contract has been let to the Truscon Steel Co., 1505 Race Street. The company specializes in the manufacture of steel springs, etc.

The Foreign Trade Bureau, Philadelphia Commercial Museum, has received the following inquiries: 42732, from Th. Eliadi Brothers, Yannoulato's Building, Piraeus, Greece, interested in getting in touch with American manufacturers of machinery for the production of shoe lasts, also machinery for the manufacture of starch; 42719, from Marcos Jimenez R, successor of Jimenez, Baird & Co., Apartado No. 632, San Jose, Costa Rica, desiring to get in touch with manufacturers of machinery, molds and equipment for the manufacture of fire brick and porcelain; 42742, from "Biosca," Calle Almogavares 58, Barcelona, Spain, in the market for carbonic gas tubes, automatically sealed, and for steel bottles for carbonic acid, with valve, etc.; 42715, from E. Vernon Pynegar, 9 Rathbone Place, Oxford Street, London, W. 1., England, interested in electric lighting plants and supplies, pumping and mining plants, steam, oil and gas engines, locomotives, machine shop equipment and tools, small tools, etc.; 42737, from Fabio Murga y Acebal, Guernica, Spain, desiring to get in touch with manufacturers of furnaces for the manufacture of refractory and ordinary brick, china, porcelain, etc.; 42723, from Luis M. Zincke Rubine, Milan 62, Matanzas, Cuba, desiring to get in touch with American manufacturers of electrical wires, supplies, etc.; 42731, from Santiago R. Robie, P. O. Box 717, Aguadilla, Porto Rico, interested in the purchase of small tin boxes; 42727, from Manuel Castillo, Edificio Alicia No. 1, Madero y Aduana, Tampico, Mex., in the market for machinery for making embossed labels, advertising stickers, etc., and 42734, from L. A. Hertogs, Port Louis, Mauritius, desiring to get in touch with manufacturers of sack-filling machinery, petrol locomotives, on

rail, as a substitute for steam locomotives as now used in sugar mills.

The H. B. Smith Co., Seventeenth and Arch Streets, Philadelphia, manufacturer of boilers, radiators, etc., has taken title to property on Gray's Ferry Avenue, adjoining its plant in this section, for \$40,000 and will use for expansion.

The Clearfield Textile Machine Co., 1826 East Clearfield Street, Philadelphia, has taken title to a one-story building on site, 114 x 491 ft., on Rockland Street, for \$120,000, to be used in connection with its works.

The Eureka Flint & Spar Co., Lewis Street, Trenton, N. J., is planning to rebuild its local plant No. 2, on New York Avenue, destroyed by fire Oct. 11, with loss of \$60,000 including pulverizing, grinding, sorting and other machinery. Frank W. Thropp is president.

Fire, Oct. 17, destroyed a portion of the plant of the Consolidated Body Co., Sharon, Pa., manufacturer of automobile bodies, with loss estimated at \$45,000 including equipment. Tentative plans for rebuilding are under consideration.

The Cornwall School Board, Cornwall, Pa., is considering the installation of manual training equipment at its proposed two-story and basement high and grade school, estimated to cost \$160,000, for which plans are being drawn by Ritter & Shay, North American Building, Philadelphia, architects.

M. C. Yoder, Mount Carmel, Pa., has taken over a local building for the manufacture of automobile truck bodies, wagon bodies, parts, etc.

The Doylestown Concrete Brick & Block Co., Doylestown, Pa., has begun the construction of a new plant along the line of the Philadelphia & Reading Railway, to cost approximately \$50,000 with equipment. S. G. Davis, Doylestown, is president, and Robert G. Wood, secretary and treasurer.

The Downingtown Industrial School, Downingtown, Pa., is said to have preliminary plans for the rebuilding of its machine department and other divisions, destroyed by fire Oct. 13.

J. T. Landa, 39 Sanhican Drive, Trenton, N. J., is seeking information regarding equipment of a foundry and machine shop in Leon, Guanajuato, Mex., and desires quotations on lathes, drilling machines, grinding machines, foundry cupolas, etc.

A lathe, drill press, grinder and other electrically operated equipment will be required by the Franks Motor Co., 206 Hamilton Street, Allentown, Pa., in connection with a one-story garage and service station to cost \$45,000, now under construction.

Cleveland

CLEVELAND, Oct. 20.

THE improvement that developed in the demand for machinery early in the month is not holding up. Orders placed during the week were mostly for scattered tools, although a local builder bought several used and rebuilt machines. The New York Central Railroad has sent out an inquiry for a 27-in. engine lathe with a 14-ft. bed. New inquiries are light and dealers do not look for improvement until after election.

Manufacturers of molding machines who had exhibits at the Milwaukee convention report that a good deal of interest was shown in their exhibits. Some orders were booked, and many good prospects were developed. Manufacturers of some other lines made similar reports, but in some of the small tool lines the amount of interest shown was rather disappointing.

The Bourne-Fuller Co., Cleveland, is having plans prepared for a four-story addition, 72 x 176 ft., to its bolt and nut works. Willard Brown is the company's chief engineer.

The Clay City Pipe Co., Uhrichsville, Ohio, is having plans prepared for a three-story factory, 120 x 240 ft. This will ultimately contain 16 kilns. E. E. Hillyer is the company's engineer.

The Etna Machine Co., Toledo, Ohio, has awarded contract for a three-story and basement factory, 60 x 83 ft.

A manual training shop will be provided in a senior high school to be built shortly in Warren, Ohio. Mrs. Margaret E. Wright is clerk of the Board of Education.

Samuel Davis, Toledo Factory Building, Toledo, Ohio, is having plans prepared for a one-story and basement factory, 100 x 100 ft., for the Toledo Ignition Co. J. G. Crawford is secretary of the latter company.

The Crane Market

BUT little pending business in cranes has been closed in the past week and new inquiries in the market are few. The New Jersey Zinc Co., reported to have closed last week on two 2-ton cranes, is understood to have closed also on two 10-ton hand power cranes. No action has yet been taken by the Public Service Production Co., Newark, on any of the cranes for which it has been in the market recently, although the two locomotive cranes under inquiry by this company may be placed soon. The Borough Asphalt Co., Brooklyn, N. Y., which recently received bids on a special type gantry crane to handle a 1½-cu. yd. bucket, has awarded the contract involving the crane to Warren Bros. Co., 50 Church Street, New York, and it is understood that this company will buy the crane. The Morgan Construction Co., Worcester, Mass., recently in the market for two 10-ton electric traveling cranes, is reported to have purchased. R. S. Christie, Inc., Elizabeth, N. J., recently in the market for a 5-ton, 46-ft. span electric traveling crane, has purchased a used Chesapeake crane of 5-ton capacity. The California-Oregon Power Co., Thrall, Cal., has purchased two 40-ton, 36-ft. span, 3-motor overhead cranes. The U. G. I. Contracting Co., Philadelphia, has rented a 25-ton Browning crane from a dealer for use at Syracuse.

Political considerations are evidently somewhat of a factor in the crane market. An order was recently placed in the Pittsburgh district for several cranes, but it was followed a few days later by a postponement pending the result of the election. An order for eight 10-ton cranes by the Bethlehem Steel Co. for its Lackawanna works was the outstanding piece of business of the past week.

A manual training department will be provided in a high school planned for East Liberty, Ohio. H. S. Lane is clerk of the Board of Education.

The Capstan Glass Co., Connellsville, Pa., has awarded the Austin Co., Cleveland, contract for two new factory units. These will be one and two-story buildings, providing 100,000 sq. ft. of floor space and will contain a machine shop, furnace, shipping and other departments.

W. Pitt Barnes, operating a Dodge Brothers automobile distributing plant on Nineteenth Street, Cleveland, Ohio, has awarded contract for a two-story sales and service plant at 7915 Broadway, to cost \$100,000. Lathes, drill presses, electric motors, etc., will be required.

The McIntosh Engine Co., Cleveland, has been incorporated to manufacture engines for motor boats. Its product will be a fireproof marine engine in complete unit. Manufacturing will be done by contract. No awards have yet been made. James McIntosh, 2964 Cuydon Road, Cleveland Heights, heads the company.

Chicago

CHICAGO, Oct. 20.

MACHINE tool buying continues to lag as the Presidential election approaches. Considerable business is expected to develop, however, when business is freed from political uncertainty. The Commonwealth Edison Co., Chicago, has issued a list which is published in full. The Chicago Board of Education, which recently purchased a large number of tools for its technical high schools, is about to enter the market for 24 engine lathes for the Tilden high school. The Camel Co., McCormick Building, Chicago, has purchased several special punching machines and is also in the market for other equipment for its new plant now under construction at Hammond, Ind.

The Nash Motor Co., Kenosha, Wis., has placed an order for a 20-in. shaper, but so far as can be ascertained, no further purchases have been made for its subsidiary, the Ajax Motors Co., Racine, Wis. The Koehring Machine Co., Milwaukee, Wis., is in the market for miscellaneous equipment. The Beloit Iron Works, Beloit, Wis., has ordered a motor-driven 62-in. King boring mill with two heads. The W. F. & John Barnes Co., Rockford, Ill., has bought a 3½-in. Universal Machine Co., horizontal boring mill. None of the expected railroad lists has made its appearance, but the Burlington has entered the market for a car wheel borer for its Centralia, Ill., shop.

Commonwealth Edison Co., Chicago

(All machines to be motor-driven.)

One 12-in. x 10-ft. coneless or geared head engine lathe.

Among recent purchases are:

Newport News Shipbuilding Co., Newport News, Va., two 25-ton locomotive cranes from the Browning Co.

Canadian National Railways, Montreal, a 40-ton, 35-ft. span gantry crane from a builder in the East.

Edwin Shuttleworth & Co., Long Island, N. Y., a 5-ton, 60-ft. span overhead traveling crane from the Shaw Electric Crane Co.

Excell Foundries, Lebanon, N. J., five 1-ton underhung hand power cranes from the Chisholm-Moore Mfg. Co.

International Cement Co., Norfolk, Va., a 25-ton used Browning locomotive crane from a local dealer.

Bethlehem Steel Corporation, Bethlehem, Pa., eight 10-ton, 85-ft. span double trolley cranes for the Lackawanna plant, from the Cleveland Crane & Engineering Co.

Jones & Laughlin Steel Corporation, Pittsburgh, two 40-ton trolleys, one with 20-ton auxiliary, for the duplexing department of the South Side works, from the Alliance Machine Co., which also will provide new end carriages in connection with girder changes.

H. B. Smith Co., Westfield, Mass., a 2-ton, 44-ft. span, 3-motor overhead crane and a 1-ton, 3-motor, monorail hoist for a new warehouse in Philadelphia, from the Shepard Electric Crane & Hoist Co.

Hunt-Spiller Mfg. Corporation, South Boston, a 5-ton, 3-motor, cage control, overhead crane from the Shepard Electric Crane & Hoist Co.

Boston & Maine Railroad, two ½-ton, floor control hoists for its Fitchburg Mass., shops, from the Shepard Electric Crane & Hoist Co.

One 24-in. x 14-ft. coneless or geared head engine lathe.

One 36-in. x 24-ft. coneless or geared head engine lathe.

One 72-in. boring mill.

One 20-in. back geared shaper.

One 27-in. sliding head drill with No. 12 swivel jaw vise.

One ½-in. high speed drilling machine.

One 6 x 6-in. high speed power saw.

One 12-in. two-wheel grinding machine.

The Pullman Car & Mfg. Corporation, Pullman Building, Chicago, has awarded a contract for a one-story car finishing shop, 268 x 484 ft., at Pullman, Ill., to cost \$500,000.

The Mueller Co., Decatur, Ill., has broken ground for an addition adjoining the foundry of the Mueller Iron Foundry Co., a subsidiary corporation making the castings for the parent company. It will be triangular in shape and will have a frontage of 213 ft. on Eldorado Street and more than 200 ft. along the Cincinnati, Indianapolis & Western right-of-way.

Hugh, Lyons & Co., manufacturers of show cases, Lansing, Mich., are constructing a power plant to generate electricity used in its factory.

Hardinge Brothers, Inc., 4145 East Ravenswood Avenue, Chicago, manufacturer of machine tools, parts, etc., has awarded a general contract to Schmidt Brothers, 22 East Huron Street, for a two-story and basement addition to cost approximately \$38,000. Richard Griesser, 64 West Randolph Street, is architect. Franklin H. Hardinge is president.

Wood & Weber, Tramway Building, Denver, Colo., engineers, have plans for a new steam-operated electric power plant at Colorado Springs, to cost \$400,000. A hydroelectric power plant, about 1000 hp. capacity, will also be constructed, to be operated in conjunction with the steam plant.

The Chicago Nut Mfg. Co., 2513 Cullerton Street, Chicago, manufacturer of nuts, studs, bolts, etc., has plans for a three-story addition, 50 x 120 ft., to cost \$200,000 with equipment. Shankland & Pingrey, 209 South La Salle Street, are architects. W. S. Quinlan is president.

Manual training equipment will be installed in the three-story and basement central junior high school to be erected at Sioux City, Iowa, estimated to cost \$225,000, for which foundations will be laid at once. Beuttler & Arnold, Grain Exchange Building, are architects.

The Edward Mikkelsen Co., 1725 Dickson Street, Chicago, manufacturer of toys, games, etc., has awarded a general contract to S. N. Nielson & Co., 3059 Augusta Street, for a three-story and basement addition, 80 x 175 ft., to cost \$100,000 with equipment.

The Midland Structural Steel Co., 1200 South Fifty-fourth Avenue, Cicero, Ill., is in the market for a 10-ton crane with 60-ft. span, and for a rotary planer with 30 x 42-in. cutting head.

The Vaughan Co., 730 North Franklin Street, Chicago, is in the market for about 6000 No. 6200 ball bearings and equipment.

J. S. Losee, Hebron, Ill., is in the market for an 18 or 20-in. disk grinder.

Milwaukee

MILWAUKEE, Oct. 20.

NOT only local but outside firms which exhibited shop equipment at the exposition in conjunction with the American Foundrymen's convention in Milwaukee last week profited materially in new business. An otherwise slow market was thereby freshened considerably. Machine-tool builders have been receiving some orders in a small way from automotive industries, but the volume is hardly comparable to a year ago. The Ajax Motors Co. list is the most important prospective requirement of present interest.

The Jacobson Auto Co., 207 East Washington Street, Madison, Wis., has plans by Edward Tough, local architect, for a \$100,000 garage, sales and service building, 100 x 120 ft., two stories and basement. The machine shop will occupy about 7500 sq. ft. and require practically a full complement of new tools.

The Milwaukee Board of School Directors, Tenth and Prairie Streets, has engaged Van Ryn & DeGelleke, architects, 112 Grand Avenue, Milwaukee, to prepare plans for a new public school building, including a manual training department. The cost is estimated at \$350,000. Bids probably will be taken about Dec. 1 or 15. Frank M. Harbach is secretary and business manager.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., has purchased for \$37,000 a site at Fifteenth and Washington Streets, adjoining its main works, and is planning the erection of an extension. The branch factory at St. Louis, Mo., has been abandoned, and the operation transferred to the Manitowoc factory and the branch works at Two Rivers, Wis. George Vits is president.

The Kenosha, Wis., Die & Stamping Works, Inc., has increased its capital stock from \$10,000 to \$25,000 and is preparing to enlarge its plant and equipment.

Louis E. Jensen, Wisconsin Rapids, Wis., is awarding contracts for the erection of a public garage, with service department, 50 x 100 ft., one story and basement, costing about \$22,000. The architect is M. C. Jacobson.

Cincinnati

CINCINNATI, Oct. 20.

MACHINE tool business continues to show improvement, and a number of orders were placed the past week. There seems to be more bona fide inquiries in the market than for some time past, mostly for one and two machines. The largest reported transaction was a purchase by the Maxwell Motors Corporation, which included approximately 40 tools for its Chrysler division and for its Newcastle, Ind., plant. The Standard Sanitary Mfg. Co., Louisville, Ky., has not closed as yet for its turret lathes, although it has been buying other equipment. The list of the Louisville & Nashville Railroad for New Orleans shops is still active. The most encouraging feature of the machine tool situation is, perhaps, the resumption of buying from automotive manufacturers in the Detroit district. Railroad lists are not a big factor at this time, most of the orders coming from diversified interests in widely scattered localities.

The Fischer Special Mfg. Co., Cincinnati, manufacturer of special machinery, has commenced the erection of an addition to its plant. Equipment has practically all been purchased.

The Wabash Portland Cement Co., Ford Building, Detroit, is preparing plans for a cement plant at Osborn, Ohio, and bids for the erection will probably be asked within three weeks. It will have a completely equipped machine shop. Local office of the company will be located at Osborn, this week.

The Auto-Motive Lighting Device Co., Columbus, Ohio, incorporated for the purpose of manufacturing a device for eliminating the glare from automobile headlights, has taken over part of the plant formerly occupied by the

Allen Motor Car Co., 400 Dublin Avenue, and expects to be in production before Nov. 1. C. F. Young is president.

The Reliable Pattern Works, Cincinnati, organized with capital stock of \$20,000, has moved into its new plant at 2822-28 Spring Grove Avenue, where brass, bronze and aluminum castings will be turned out in addition to the regular line of wood and metal patterns. A building has been purchased and the company is in the market for foundry supplies and metals. E. T. Korten is one of the heads.

Ovens, power equipment, conveying machinery and other equipment will be installed in the one and two-story plant to be erected at Eighth and Jefferson Streets, Lexington, Ky., by the Grocers' Baking Co., Louisville, estimated to cost \$100,000. A one-story automobile service and repair building will also be built. H. A. Churchill and John T. Gillig, Fayette Bank Building, Lexington, are architects.

Henry Pilcher's Sons, 918 Mason Street, Louisville, manufacturers of pipe organs, have awarded a general contract to the George Rommell Co., Louisville, for the erection of a three-story addition, 50 x 150 ft., to cost approximately \$55,000. Metal and woodworking equipment will be installed. Fred Erhart, Louisville, is architect.

The Mississippi River Commission, First and Second Districts, Memphis, Tenn., will take bids until Oct. 29 for two 25-hp. squirrel cage induction motors, three-phase, 60-cycle, 220 volts, 1750 r.p.m., with starting compensator, etc., circular 37.

Wurts Garage, Ashland, Ky., J. W. Wurts, head, is having plans drawn for a two-story and basement service, repair and garage building, L-shaped, 50 x 52 ft., estimated to cost \$75,000. Tyson & Forbes, Grand Theater Building, are architects.

The Columbus Railway, Light & Power Co., Columbus, Ohio, is reported to be planning for the construction of a new steam-operated electric generating plant about 10 miles from the city, estimated to cost \$3,500,000 with equipment.

New England

BOSTON, Oct. 20.

THE freer movement of machine tools noted the two previous weeks appears to have died out. The sale of a new Universal milling machine to a Honolulu pineapple cannery, another to an eastern Pennsylvania machine shop, and a third machine to a Michigan shop, a 600 lb. steam hammer to a Barre, Vt., user, a used upright drill to a Connecticut shop, a used Van Norman milling machine to a Michigan manufacturer, several small used lathes to nearby and Massachusetts industrial firms, and a used press to a central Massachusetts manufacturer constitute the most important equipment sold the past week. A number of metal-working tools are pending, but buyers have decided to await the outcome of the national election before making an investment.

Small tools are selling freely. Buyers include a diversified list of manufacturers, indicating a gradual improvement in industrial conditions in New England, and possibly the forerunner of good machine tool purchases. Most of the large industrial firms in this section of the country, for the first time in many months, are maintaining stocks of dies, cutting tools, etc.

Work will start about Nov. 1 on a manufacturing plant on North Beacon Street, Brighton, Boston, for the Wood Hydraulic Holst & Body Co., 3371 Washington Street, Jamaica Plain, Boston. The Warren Engineering Co., Terminal Wharf, Charlestown, Boston, prepared the plans.

The Ray-dlo Oil Burner Co., Central Falls, R. I., has been organized to manufacture oil burning equipment for household furnaces. Castings will be made in a local foundry, but other parts will be made by the company, which is in the market for equipment. F. H. Keran is president.

Plans are being prepared by Dwight E. Smith, 152 Temple Street, New Haven, Conn., for a two-story factory and office, 88 x 192 ft., for the Thermo Electric Co., New Haven. The name of this company was incorrectly given in a previous issue as the Thermos Electric Co.

The Magic Lamp Corporation, 1612 Main Street, Bridgeport, Conn., organized with capital stock of \$50,000, will manufacture as indicated and is in the market for equipment and materials. O. Lamacchia is one of the heads.

H. L. Shattuck, Inc., Manchester, N. H., has been

awarded a general contract for the erection of a new paper mill to cost approximately \$100,000 for the Nashua River Paper Co., Pepperell, Mass.

Plans have been completed for the construction of a new hydroelectric power plant by the Wilton Woolen Co., Wilton, Me., to cost about \$25,000.

The Stilphen Motor Co., 395 Columbia Road, Dorchester, Mass., will take bids on a general contract for a new service, repair and garage building to cost \$100,000 with equipment. Harold F. Kellogg, 110 Summer Street, Boston, is architect.

F. H. Gowing, 101 Tremont Street, Boston, architect, has plans for a two-story automobile service, repair and garage building at Woburn, Mass., estimated to cost \$85,000.

The Simons Saw & Steel Co., 17 Covington Street, Boston, has filed plans for a one-story addition for general manufacturing.

Bird & Son, Inc., Walpole, Mass., manufacturer of roofing products, has awarded a general contract to J. A. Munroe, North Attleboro, Mass., for a one and two-story addition, 65 x 450 ft., to cost approximately \$150,000.

The Fire Department, New Bedford, Mass., has foundations under way for a one-story addition to its machine and repair shop, for which a contract recently was let to Herbert Griffith, 13 Brigham Street. Chase, Pierce & Chase, Zeitz Building, are architects.

Strand & Sweet, Winsted, Conn., manufacturers of wire products, are having plans drawn for a one-story power house, with installation to include a Diesel engine, electric generator and accessory equipment.

Detroit

DETROIT, Oct. 20.

PROPERTY near Plymouth, Mich., totaling 140 acres, has been acquired by the Burroughs Adding Machine Co., 6071 Second Street, Detroit, as a site for a new plant. The present Detroit works and local headquarters will be maintained. Standish Backus is president.

The Michigan Tool Co., 147 Joseph Campau Avenue, Detroit, will proceed with the erection of a two-story addition, estimated to cost \$23,000 with equipment.

The Detroit Edison Co., 2000 Second Street, Detroit, is disposing of a bond issue of \$12,500,000, a portion of the proceeds to be used for extensions and improvements. The company has an expansion program in progress calling for a fund of \$25,000,000 until next May, to include generating plant additions, transmission line extensions and the construction of two automatic power substations at Detroit; the last noted will cost \$1,350,000 with equipment.

The Board of Education, Iron River, Mich., plans the installation of manual training equipment in the proposed three-story and basement high school estimated to cost \$300,000, for which plans are being drawn by Van Leyen, Schilling, Keough & Reynolds, 3441 Cass Avenue, Detroit, architects, and D. E. Anderson, Iron River, associate architect.

The F. Joseph Lamb Co., precision tool and gage maker, 1938 Franklin Street, Detroit, is in the market for a used No. 16 Blanchard surface grinder, direct motor driven, with a 220-volt, 60-cycle, 3-phase motor.

The International Harvester Co., 606 South Michigan Avenue, Chicago, is inquiring for a 500-ton straight column, double crank press, with 12 ft. between uprights, also a 2-in. upsetter.

The Gibb Instrument Co., Bay City, Mich., manufacturer of electric welding machines and electric heating machines, has broken ground for a new plant.

Pittsburgh

PITTSBURGH, Oct. 20.

BUSINESS is slow in machine tools in this district. Sales run entirely to single tools and new inquiries not only are few, but several contain the intimation that action upon them depends upon the outcome of the Presidential election.

Phillips, Evans & Phillips, manufacturers of garage hoists and equipment, Pittsburgh, have acquired property at Meadville, Pa., and will erect a factory. Headquarters will be moved from Pittsburgh to the latter city.

Fire, Oct. 15, destroyed the major portion of the plant and equipment of the Consolidated Body Works, Grove City, Pa., entailing a loss of \$40,000. Plans for rebuilding are under consideration.

Electrical pumping and other machinery will be required

in connection with a new reservoir to be erected at Franklin, Pa., for which the city council is arranging a bond issue of \$100,000. John McK. Snow, city engineer, is in charge.

The Haddock Mining Co., Leffty, Pa., has acquired coal lands in the Silver Brook coal region, and has plans under way for development work, which will include the installation of power equipment, transmission, conveying and hoisting machinery, coal tippie, etc.

The Sugar Creek Foundry Co., Franklin, Pa., recently organized, has awarded contract for a one-story building, 80 x 260 ft., for the production of gray iron castings. Foundry and machine shop equipment will be required.

W. F. Overly & Sons, Greensburg, Pa., manufacturers of architectural sheet metal products, etc., has awarded a general contract to the Cavalier Construction Co., Pittsburgh and Madison Streets, for a two-story and basement addition, 35 x 90 ft., to cost \$42,000.

The Board of Education, West View, Pa., is planning for the installation of manual training equipment in its two-story and basement junior high school, estimated to cost \$150,000, for which plans are being prepared by George H. Schwan, People's Bank Building, Pittsburgh, architect.

The Corry-Jamestown Mfg. Co., 19 North Center Street, Corry, Pa., manufacturer of metal furniture, has awarded a general contract to Chapman & Graham, Jamestown, for its four-story addition, 61 x 130 ft., to cost \$65,000. A power house will also be built under the same award. Oliver Johnson, Jamestown, N. Y., is architect and engineer.

The Air Cleaning & Sizing Co., 1302 Union Trust Building, Pittsburgh, has been organized with authorized capital of \$150,000 and plans to manufacture equipment for cleaning and sizing coal. No construction is contemplated, all work to be let out to contract. Howard Evanson is president.

Indiana

INDIANAPOLIS, Oct. 20.

TENTATIVE plans are being considered by the Graham Brothers Motor Truck Co., Evansville, Ind., for an addition to its plant on site recently purchased on the Stringtown Road, one-story, estimated to cost \$200,000 with equipment. Dodge Brothers, Inc., Detroit, is said to have taken over a controlling interest in the Graham company and will operate hereafter as a division of its organization. Immediate development provides for a new motor truck model of 1-ton capacity, with parts production, etc.

The Camel Co., 332 South Michigan Avenue, Chicago, manufacturer of freight car appliances, door fixtures, etc., has awarded a general contract to the Austin Co. for the first unit of a new plant at Hammond, Ind., 190 x 320 ft., estimated to cost \$100,000 with equipment. Other units will be built later. The company is now operating a plant at Hegewisch, Chicago. T. H. Goodnow is vice-president.

The Indianapolis Paper Can & Tube Co., Indianapolis, will remove its plant to larger quarters at 1022 East Michigan Street, where additional equipment will be provided.

Henry Hosler, Indianapolis, will operate a plant at 23 North East Street, where property was recently acquired, for the manufacture of oil burners and kindred apparatus.

The Indianapolis Bolster Spring Co., Indianapolis, is in the market for a plate shear, capacity 48 x 1 in. and 24 x 1½ in.; also a shear for 12 x 2 in. flats and 4-in. squares. It is also interested in a geared or hydraulic press to punch 8-in. disks through 1-in. plate.

St. Louis

ST. LOUIS, Oct. 20.

PLANs are being drawn by the M. K. Goetz Brewing Co., Sixth and Albemarle Streets, St. Joseph, Mo., for a three-story addition to its cold storage plant, 55 x 65 ft., estimated to cost \$60,000 with machinery. E. R. Meir, Lincoln Building, is architect. William Goetz is manager.

The Lincoln Rice Farming Co., Elsberry, Mo., A. V. Rowe, representative, plans the installation of three combination electric light and power and pumping units, comprising 100 hp. engine, with dynamo, 10,000-gal. per min. pump, with accessory equipment, in connection with an irrigation system for about 30,000 acres.

The Cape Sand Co., Cape Girardeau, Mo., is planning the establishment of new works on Main Street, where a site, 115 x 145 ft., is available, to include screening, conveying, loading and other equipment.

The McDaniel Motors, Inc., Pine Bluff, Ark., contemplates the establishment of a motor truck assembling and parts plant. Joseph W. McDaniel is head.

Manual training equipment will be installed in the three-story and basement high school to be erected at Jefferson City, Mo., estimated to cost \$300,000, for which bids will be asked on a general contract about Nov. 15. Owen, Payson & Carswell, 505 Interstate Building, Kansas City, Mo., are architects.

Arthur J. Hess, 3625 Montana Street, St. Louis, general contractor, has the general award for a local three-story factory, 50 x 100 ft., estimated to cost \$60,000, for the manufacture of refrigerators, store fixtures, etc., for a company whose name is temporarily withheld.

The Department of Public Utilities, St. Louis, plans the construction of a power house in connection with a projected municipal mechanical laundry, estimated to cost \$400,000 with machinery. Kurt Toensfeldt is engineer.

The Common Council, Catoosa, Okla., plans the installation of centrifugal pumping equipment in connection with a proposed municipal waterworks. A water tank and tower will also be installed. The Holway Engineering Co., New Wright Building, Tulsa, Okla., is engineer.

Manual training equipment will be installed in the new high school to be erected at Guthrie, Okla., estimated to cost \$300,000, for which superstructure work will proceed at once. The Board of Education is in charge.

Edward W. Tanner, Meyer Boulevard and Ward Parkway, Kansas City, Mo., architect, has awarded general building contracts for a two-story and basement automobile service, repair and garage building, 95 x 125 ft., at 215 Krauthoff Court, estimated to cost \$75,000.

The William C. Johnson & Sons Machinery Co., 1001 North Sixth Street, St. Louis, is in the market for 36 6-in. H-beams, 23.8 lb., 18, 21½ ft. long and 18, 13 ft. 3 in. long; 60 I-beams, 18 ft. 2 in. long, 20, 12-in., 27.5 lb.; 20, 15-in., 36 lb., the remainder 9-in., 21 lb.

South Atlantic States

BALTIMORE, Oct. 20.

CHARLES A. BOWERS, Baltimore, has acquired the plant at Southern Avenue and Belair Road, formerly occupied by the American Tool & Machine Co., for the manufacture of dies and other machined products. A general machine shop will also be operated.

Fire, Oct. 12, destroyed a portion of the plant of the Baltimore Coppersmith Co., Washington Street, Baltimore, and that of the Southern Can Co., on adjoining site, with combined loss estimated at \$200,000 including equipment, stock, etc. Both companies plan to rebuild.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Oct. 28 for 500,000 ft. mine mooring cable, for the Navy Yard at Yorktown, Va., schedule 2784; for 150 crucibles for the Philadelphia Navy Yard, schedule 2788, and miscellaneous aluminum alloy for the Philadelphia yard, until Nov. 4, schedule 2792.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for four heavy duty, 4-side planers, Fay & Egan, or other approved type, about 24 x 8 in.

The Estill Enterprise & Fertilizer Co., Estill, S. C., is planning to rebuild the portion of its local ice-manufacturing plant, electric lighting plant, feed milling plant and cotton ginnery, destroyed by fire Oct. 11, with loss of \$150,000 including equipment.

The Common Council, Franklin, N. C., has arranged for a bond issue of \$300,000, the proceeds to be used for the construction of a municipal hydroelectric generating plant on the Little Tennessee River, with initial output of 2500 hp.

The Motor Cylinder Grinding & Machine Co., Savannah, Ga., is planning the installation of a grinding machine for handling crankshafts, piston and engine cylinders, etc. T. S. Lipsey is head.

The Wayne Agricultural Works, Inc., Goldsboro, N. C., has begun enlargements in its plant, to include additions to the foundry and a one-story wood-working plant, estimated to cost \$30,000. D. W. Davis is president.

The Maryland Garage Co., Silver Spring, Md., plans the construction of a one and two-story service, repair and garage building, to cost \$35,000.

The Southern Railway System, Washington, will proceed with the construction of its proposed locomotive repair shops at Asheville, N. C., for which a general contract recently was awarded to John P. Pettyjohn & Co., Lynchburg, Va.

J. F. Griner, Fort Valley, Ga., is in the market for a gas engine, about 7 hp., and accessory apparatus.

The Wilson-Hock Co., City Point, Va., machinery dealer, has inquiries out for centrifugal pumps, electric-operated, about 500 gal. per min. capacity, with three-phase, 60-cycle, 440-volt motor; also for several transformers, 50

and 150 kva., each, single-phase, 60-cycle, 2200, 230, 460 volts.

Fire, Oct. 10, destroyed a portion of the plant of the Armour Fertilizer Works, Navassa, N. C., with loss estimated at \$100,000 including machinery. Tentative plans for rebuilding are under advisement. Headquarters are at the Union Stock Yards, Chicago.

The Ford Motor Co., Detroit, has awarded contract to Hitt Brown, 137 West Charlotte Street, Norfolk, Va., for the complete electrification of its new local assembling plant in the Newton Park section, estimated to cost \$100,000 with motors, controls, etc. The entire works will represent an investment of close to \$1,000,000 with machinery.

The Trump Brothers Machine Co., Beech and Anchorage Streets, Wilmington, Del., is said to be planning to rebuild the portion of its shop destroyed by fire Oct. 9, with loss approximating \$20,000.

The purchasing agent, Post Office Department, Washington, will take bids until Oct. 27 for one air compressor.

J. L. Copeland, chairman Board of Commissioners of Public Service, Ehrhardt, S. C., will take bids until Nov. 5 for equipment for a complete municipal waterworks, including pumping machinery, 75,000-gal. tank and water tower, valves, hydrants, etc. The Ryan Engineering Co., Arcade Building, Columbia, S. C., is engineer.

The International Agricultural Corporation, Red Rock Building, Atlanta, Ga., has awarded a general contract to Hugger Brothers, Bell Building, Montgomery, Ala., for a new fertilizer plant at Arkwright, Ark., to replace a works destroyed by fire several weeks ago. It will cost about \$125,000 including equipment.

The chief of air service, United States Army, Washington, will receive bids until Nov. 10 for miscellaneous engine and airplane parts and accessories, 100 fuel pump drive assemblies, 100 flexible shaft drive assemblies, 650 fuel tank filler units, 275 clock mounting assemblies, 200 fuel relief valves, fuel cock assemblies, 125 unit sight mount clamps, etc., circular CAS-27.

The Carolina Motor & Machine Co., Henderson, N. C., is in the market for one deep well pump, direct-acting, steam-driven, capacity 400 to 600 gal. per hr.

The Tom Huston Mfg. Co., Columbus, Ga., is in the market for a second hand foundry cupola, 48 in. outside diameter, complete with blower.

The recently organized Bankers' Automatic Receiving Teller Co., Inc., 1021 New York Avenue, Northwest, Washington, plans to manufacture machines weighing about 100 lb. for receiving and recording bank deposits automatically. The various parts, including lightweight stampings, die castings, iron castings, gears, cams, springs and shafts will be manufactured under contract. S. T. Schofield is vice-president.

Gulf States

BIRMINGHAM, Oct. 20.

THE proposed oil refinery to be erected at Panhandle, Tex., by J. W. Wrather, Amarillo, Tex., and associates, will be carried out under the name of the Big Four Refining Co., and work will soon begin. It will have an initial output of 1500 to 2000 bbl. per day and cost \$175,000 including machinery. The company is also planning the construction of a pipe line about 18 miles long.

The Dallas Power & Light Co., Dallas, Tex., will build a one-story automatic power substation at 115 South Tyler Street, to cost \$65,000.

The American Body Co., 2802 Williams Street, Dallas, Tex., is planning for the installation of additional equipment, including planer, band-saw, drill press, forge equipment, etc.

The Kerrville Ice & Electric Co., Kerrville, Tex., has arranged with T. V. Lawson, owner of the Kerrville Roller Mills, to take over that plant, consisting of a three-story building. It will be remodeled for an ice-manufacturing and cold storage plant. Present equipment of the Kerrville Ice company will be removed to the structure and additional machinery installed.

The Pemberton Carbon Cleaning Machine Co., Gainesville, Fla., is planning to place contracts for the manufacture of its carbon cleaning machine, totaling about 20,000, to be assembled during the next 12 to 18 months. The machine consists of a tripod stand and table, belting, brass tubing, flexible shaft, electric motor, pulleys, etc.

The Louisiana Power & Light Co., Shreveport, La., is said to be arranging for the construction of a new steam-operated electric generating plant in the vicinity of Monroe, La., with capacity of 100,000 hp., estimated to cost \$5,000,000. A transmission system will be built. A portion

of the output will be used by the Arkansas Light & Power Co., Pine Bluff, Ark.

Manual training equipment will be installed in the new group of high school buildings to be erected near Carlin Street, Mobile, Ala., to cost \$500,000. George E. Rogers, Van Antwerp Building, is architect, and Perkins, Fellows & Hamilton, Tower Court, Chicago, consulting architects.

The City Council, Port Arthur, Tex., will make improvements in the power house and pumping plant at the municipal waterworks, including the installation of additional machinery. Bonds for \$48,000 have been voted.

In connection with its proposed cotton mill on local site, the Marble Falls Textile Mills, Inc., Marble Falls, Tex., recently chartered with a capital of \$750,000, plans the construction of a hydroelectric generating plant on the Colorado River in this vicinity. The company is headed by R. E. Witt, Dallas, and G. L. Jones, Marble Falls.

J. C. Johnson, 1024 Clairmont Avenue, Atlanta, Ga., and associates, have acquired property at Miami, Fla., as a site for a new ice-manufacturing plant, with initial capacity of 100 tons per day.

The Birmingham Electric Co., Birmingham, is contemplating extensions in its power plant at Pratt City, Ala., with installation of additional equipment estimated to cost \$55,000.

The International Mfg. Co., 814 East Fourth Street, Austin, Tex., operating a stone finishing plant, is planning for the installation of planers, grinding wheels and other stone-finishing machinery and polishing equipment.

The Owens Universal Joint & Gear Co., Inc., Lake Worth, Fla., is in the market for spline milling machines, tempering furnaces and hardened steel balls of $\frac{1}{2}$, 1, $1\frac{1}{2}$ and 2-in. diameter. T. A. Horton is secretary of the company.

Canada

TORONTO, Oct. 20.

MACHINE tool business compares favorably with that of the past several weeks. Sales are of a diversified nature and in most cases include units of one or two tools. While considerable inquiry is for equipment for several plants under construction, the greater part of the buying is for replacement purposes. A number of buyers show their preference for new tools, but others are turning to rebuilt lines. It is reported that some \$15,000 worth of second-hand tools was sold by auction in the Montreal district during the week. Prices were considerably below the market quotations, but the sellers appeared satisfied with the results of the sale. Improved conditions among manufacturers are reflected in a stronger demand for labor and time-saving tools.

The Central Machine Shop, Peterboro, Ont., is in the market for a thread cutting machine and drill.

The Bawden Machine Co., Sterling Road, Toronto, will rebuild its plant recently destroyed by fire and will require considerable equipment.

White & Ackford, George Street, Peterboro, Ont., are in the market for a lathe, grinder and miscellaneous tools.

The Wigle Motor Sales Co., Leamington, Ont., will rebuild its automobile repair shop, damaged by fire, and will purchase a lathe, drills, grinders and other tools.

The International Paper Co., Three Rivers, Que., proposes to spend \$5,000,000 on additions and improvements to its plant. It is proposed to install three new machines in its present mill and increase the output to 600 tons per day.

The Abitibi Power & Paper Co., Canada Cement Building, Montreal, will proceed with the construction of a power development plant at Long Sault Rapids.

The plant of the Dominion Flour Mills, St. Ambroise Street, St. Henri, Montreal, Que., was destroyed by fire with a loss of \$150,000. It is expected that the mill will be rebuilt without delay.

The Elma Township Council, Monkton, Ont., proposes to build an electric light and power plant. George Lockhead, Atwood, Ont., is clerk.

W. A. Clarke, township clerk, 40 Jarvis Street, Toronto, is in the market for the following equipment for a sewage disposal plant for the township of York: Pumping machinery, sluice gates, valves, cast iron pipe, special castings, clarifier equipment, diffuser plates and air valves, air compressors, etc.

J. Robert Page, 18 Toronto Street, Toronto, has been awarded general contract for a \$40,000 addition to the plant of the Steel Co. of Canada, Ltd., at Swansea, Ont. Head office, Hamilton, Ont.

B. Caplan, 731 B. Cadieux Avenue, Montreal, is asking for bids and prices on sub-trades in connection with the erection of \$75,000 manufacturing building.

Charles Baker & Son, Meaford, N. S., has the general contract for an addition to the power plant at Bridgewater, N. S., to cost \$35,000.

The town of St. Thomas, Ont., will build a power house on Gravel Road. W. C. Miller is city engineer.

Western Canada

Hodgson, King & Marble, 508 London Building, Vancouver, B. C., will construct a machine and blacksmith shop in connection with the Burrard drydock to cost \$100,000.

C. S. Sutherland, Ltd., Edmonton, Can., is interested in quantities of second-hand 8- and 12-lb. rails.

Pacific Coast

SAN FRANCISCO, Oct. 15.

PLANs are being completed by the Forrester Cornice Works, Sixteenth Street and Potrero Avenue, San Francisco, for a new two-story plant to cost \$45,000 with equipment.

The Kuhn Service Machine Co., Porterville, Cal., M. A. Kuhn, president, has preliminary plans for a new factory at Stockton, Cal., for the manufacture of a mechanical fruit-packing device.

The McEvoy Well Cleaner Co. and the Standard Slotted Pipe Co., Higgins Building, Los Angeles, associated interests, have plans for a new factory on West Slauson Avenue, one story, 60 x 160 ft.

The City Council, Bellingham, Wash., contemplates the installation of a pumping plant in connection with extensions and improvements in the municipal waterworks, estimated to cost \$150,000. A bond issue is being arranged.

The Western Cooperage Co., Fourteenth Street, San Francisco, has awarded a general contract to the Austin Co. for a new one and two-story plant, estimated to cost \$100,000 with machinery.

Motors, controls, conveying machinery, trucks and other equipment will be installed in the six-story and basement printing plant to be constructed by the *San Francisco Bulletin*, 767 Market Street, San Francisco, estimated to cost \$500,000 with equipment. Ashley & Evers, 58 Sutter Street, are architects.

The Mack International Motor Truck Co., Los Angeles, will begin the construction of a one and two-story service, repair and garage works, 135 x 900 ft., and 250 x 300 ft. respectively, estimated to cost \$450,000, for which the general contract recently was let to the Davidson Construction Co., 1445 East Sixteenth Street. John M. Cooper, Marsh-Strong Building, is architect.

The Steel Tank & Pipe Co., Twenty-eighth and Nicolai Streets, Portland, has plans for new works at Union Avenue and Columbia Boulevard, consisting of a one-story boiler shop, 120 x 200 ft.; craneway, 60 x 160 ft., and two other structures, 50 x 95 ft., and 40 x 70 ft., one to be used for an office.

Lone Jack Mine, Glacier, Wash., has been organized to undertake the development of ore properties. It has a \$200,000 plant and equipment and is operating 24 hr. per day. Additional equipment will not be needed until spring, when the company will install an impulse hydroelectric direct-connected unit, another compressor and additional grinding equipment. Carl S. Willis is chief engineer and mine manager.

Quarterly Earnings of Republic Iron & Steel Co.

In its report for the September quarter, the Republic Iron & Steel Co. showed net profits from operations of \$235,150. Interest on bonds, \$280,529, deducted from that amount, left a net loss of \$45,380, which was increased to \$482,880 by the payment of preferred dividends. In the corresponding quarter of 1923 there was a surplus available for dividends of \$1,692,497. Operating profits for the third quarter amounted to \$460,656, against \$2,394,527 last year. Net profits for the first nine months this year were \$1,765,004, or \$1.50 per share on common stock, as compared with \$5,434,185 for the like period last year.

On Sept. 30 the company had unfilled orders on hand of 77,998 tons of finished and semi-finished products, against 60,655 tons at the close of June, and 127,767 tons on Sept. 30, 1923.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

Bars, Shapes and Plates

Bars:	Per Lb.
Refined iron bars, base price	3.24c.
Swedish charcoal iron bars, base.....	6.75c. to 7.25c.
Soft steel bars, base price.....	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in., base	3.24c.
Steel plates, ¼ in. and heavier.....	3.34c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger.....	3.25c.
(Smooth finish, 1 to 2½ x ¼ in. and larger) ..	3.50c.
Toe-calk, ½ x ¾ in. and larger.....	4.20c.
Cold-rolled strip, soft and quarter hard.....	7.00c.
Open-hearth spring steel.....	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds	4.05c.
Square, flats and hex.	4.55c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten.....	70c.

Sheets

Blue Annealed		Per Lb.
No. 10		3.89c.
No. 12		3.94c.
No. 14		3.99c.
No. 16		4.09c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c. to 4.45c.	.....
Nos. 22 and 24.....	4.45c. to 4.60c.	5.10c.
No. 26	4.50c. to 4.65c.	5.15c.
No. 28*	4.60c. to 4.75c.	5.25c.
No. 30	4.70c. to 4.95c.	.....

Galvanized

	Per Lb.
No. 14	4.70c. to 4.85c.
No. 16	4.85c. to 5.00c.
Nos. 18 and 20	5.00c. to 5.15c.
Nos. 22 and 24	5.15c. to 5.30c.
No. 26	5.30c. to 5.45c.
No. 28*	5.60c. to 5.75c.
No. 30	6.10c. to 6.25c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe

Standard Steel			Wrought Iron		
	Black	Galv.		Black	Galv.
½ in. Butt....	—41	—24	½ in. Butt....	—4	+19
¾ in. Butt....	—46	—32	¾ in. Butt....	—11	+9
1-3 in. Butt....	—48	—34	1-1½ in. Butt....	—14	+6
2½-6 in. Lap....	—44	—30	2 in. Lap....	—5	+14
7-8 in. Lap....	—41	—11	2½-6 in. Lap....	—9	+9
9-12 in. Lap....	—34	—6	7-12 in. Lap....	—3	+16

Bolts and Screws

Machine bolts, cut thread, 50 to 50 and 10 per cent off list
Carriage bolts, cut thread, 40 to 40, 10 and 10 per cent off list
Coach screws, 50 to 60 per cent off list
Wood screws, flat head iron, 75, 20, 10 and 10 per cent off list

Steel Wire

	Per Lb.
Bright, basic	4.25c. to 4.50c.
Annealed soft	4.50c. to 4.75c.
Galvanized annealed	5.15c. to 5.40c.
Coppered basic	5.15c. to 5.40c.
Tinned soft Bessemer	6.15c. to 6.40c.

*Regular extras for lighter gage.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE, under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16½c. to 18½c.
High brass wire	17½c. to 18½c.
Brass rods	14½c. to 15½c.
Brass tube, brazed	24½c. to 25½c.
Brass tube, seamless	21 c. to 22 c.
Copper tube, seamless	22¼c. to 23¼c.

Copper Sheets

Sheet copper, hot rolled, 20¼c. to 20½c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA"	Grade "A"	Coke—14 x 20	Prime	Seconds
	Charcoal 14x20	Charcoal 14x20		80 lb..	\$6.15 \$5.90
				90 lb..	6.30 6.05
				100 lb..	6.45 6.20
IC..	\$11.25	\$8.85		IC..	6.65 6.40
IX..	12.85	10.85		IX..	7.85 7.60
IXX..	14.40	12.55		IXX..	9.00 8.75
IXXX..	15.75	13.85		IXXX..	10.35 10.10
IXXXX..	17.00	15.05		IXXXX..	11.35 11.10

Terne Plates

	8 lb. coating, 14 x 20
100 lb.	\$7.00 to \$8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire door stock	9.00 to 10.00

Tin

Straits, pig	53c.
Bar	56c. to 60c.

Copper

Lake ingot	16 c.
Electrolytic	15½c.
Casting	14½c.

Spelter and Sheet Zinc

Western Spelter	7½c.
Sheet zinc, No. 9 base, casks.....	10.85c. open 11.60c.

Lead and Solder*

American pig lead	9c. to 9½c.
Bar lead	11c. to 12c.
Solder, ½ and ½ guaranteed.....	38c.
No. 1 solder	35c.
Refined solder	29c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	13c. to 14c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	36c.
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Old Metals

Values are firm and inquiry is active. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible.....	11.00
Copper, heavy wire	10.50
Copper, light bottoms	9.00
Brass, heavy	6.50
Brass, light	5.00
Heavy machine composition	8.00
No. 1 yellow brass turnings.....	7.25
No. 1 red brass or composition turnings.....	7.50
Lead, heavy	6.75
Lead, tea	5.00
Zinc	3.75
Cast aluminum	16.00
Sheet aluminum	16.00